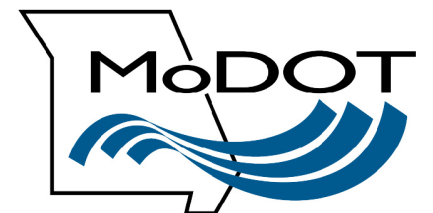




# 2022 MISSOURI State Freight & Rail Plan







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SECTION

1

# Missouri's Statewide Freight and Rail Plan







## Chapter 1: Missouri's First Integrated Statewide Freight and Rail Plan

### Multimodal Freight and Passenger Rail Planning in Uncertain Times

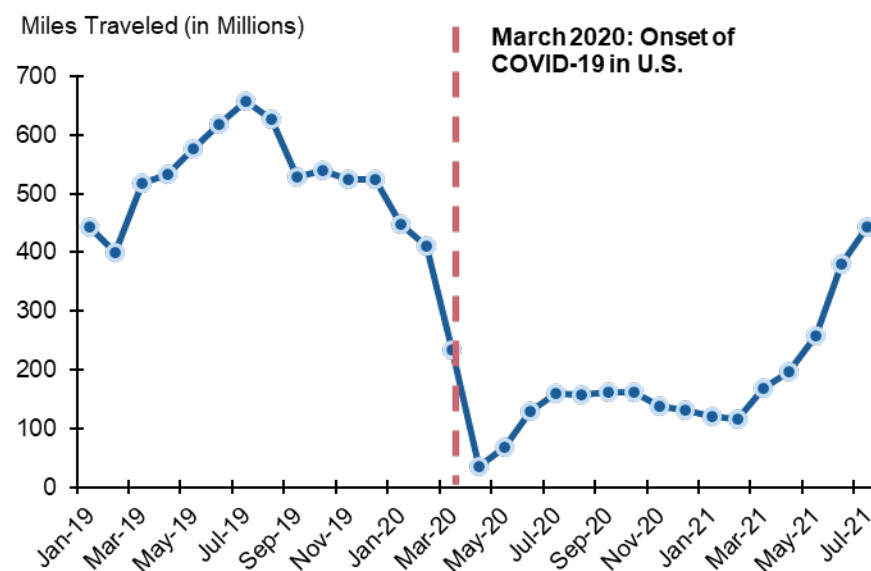
Missouri is at the crossroads of the nation, and its robust, multimodal network of freight transportation supports efficient goods movement to businesses and consumers throughout the state, country and world. Its passenger rail network also provides residents and visitors with a safe and enjoyable mode of transportation to Missouri's urban centers and cultural and tourist attractions, including Missouri Wine Country in Hermann and the Missouri State Fair in Sedalia.

Missouri Department of Transportation is undertaking the development of its first integrated statewide freight and rail plan at an unprecedented time. As the global, national and state economies recover from the COVID-19 global pandemic, supply chain disruptions across the country are driving up prices and leading to a growing shortage of goods. The supply chain bottlenecks around the world have caused record shortages of many products that Missourians are used to having readily available, from household goods to electronics to automobiles.

In addition, the pandemic substantially affected passenger rail traffic in the U.S. (Figure 1). Ridership sharply dropped as people opted to stay home to comply with lockdown orders and avoid infection, leading Amtrak to furlough employees and reduce service levels in response to revenue shortfalls after an unprecedented decline in ridership. The *Missouri River Runner* service was cut in half to just one round-trip per day in March 2020, with full service restored 16 months later in July 2021. Although ridership started to rebound

nationally by summer 2021, the pandemic is expected to change travel behaviors, routines and expectations for the foreseeable future.

**FIGURE 1. U.S. PASSENGER RAIL MILES TRAVELED PRE- AND POST-PANDEMIC**



Source: U.S. Dept. of Transportation, Bureau of Labor Statistics.

### CALL TO ACTION

The unprecedented supply chain disruptions gripping the nation and the state provides an opportune time for MoDOT to develop a blueprint for addressing the state's current and future freight transportation needs.

Missouri businesses and consumers are challenged to adapt to the post-pandemic environment. COVID-19 accelerated the emergence of a supply chain crisis that is rooted in ever-growing container ship size, imbalanced manufacturing resources and widespread adoption of just-in-time logistics. What resulted was an imbalance between supply and demand that eliminated inventory and created kinks throughout the global supply chain.

While disruptions have driven up prices and exposed vulnerabilities in the global supply chain, companies and infrastructure providers now have an opportunity to begin figuring out solutions. These include strategies to relieve gridlock at the world's busiest ports, expanding domestic production of key parts and equipment and revisiting just-in-time operations. It provides MoDOT an opportunity to more fully understand, plan for and invest in a resilient, efficient, multimodal freight transportation network that meets the needs of the state's industries, employers and residents who depend on shipping and receiving goods everyday.



### WHAT'S GOING ON WITH THE GLOBAL SUPPLY CHAIN?

There are several factors contributing to the supply chain shortages, including a growing number of workers across all sectors leaving jobs, an inability to secure key inputs from global suppliers due to shutdowns during the pandemic and increasing shortages of truck drivers and other logistics and freight transportation labor. The American Trucking Association in 2021 estimated that the industry will be short 80,000 drivers, a historic high. At the same time, large employers preparing to bring their staff back to the workplace in larger numbers led to large purchases of bulk items.

Disruptions to the supply chain at the pandemic's onset, which caused months of shortages in personal protection equipment including N95 respirators, gloves, cleaning supplies and other critical care hospital equipment, it took nearly a year to resolve.

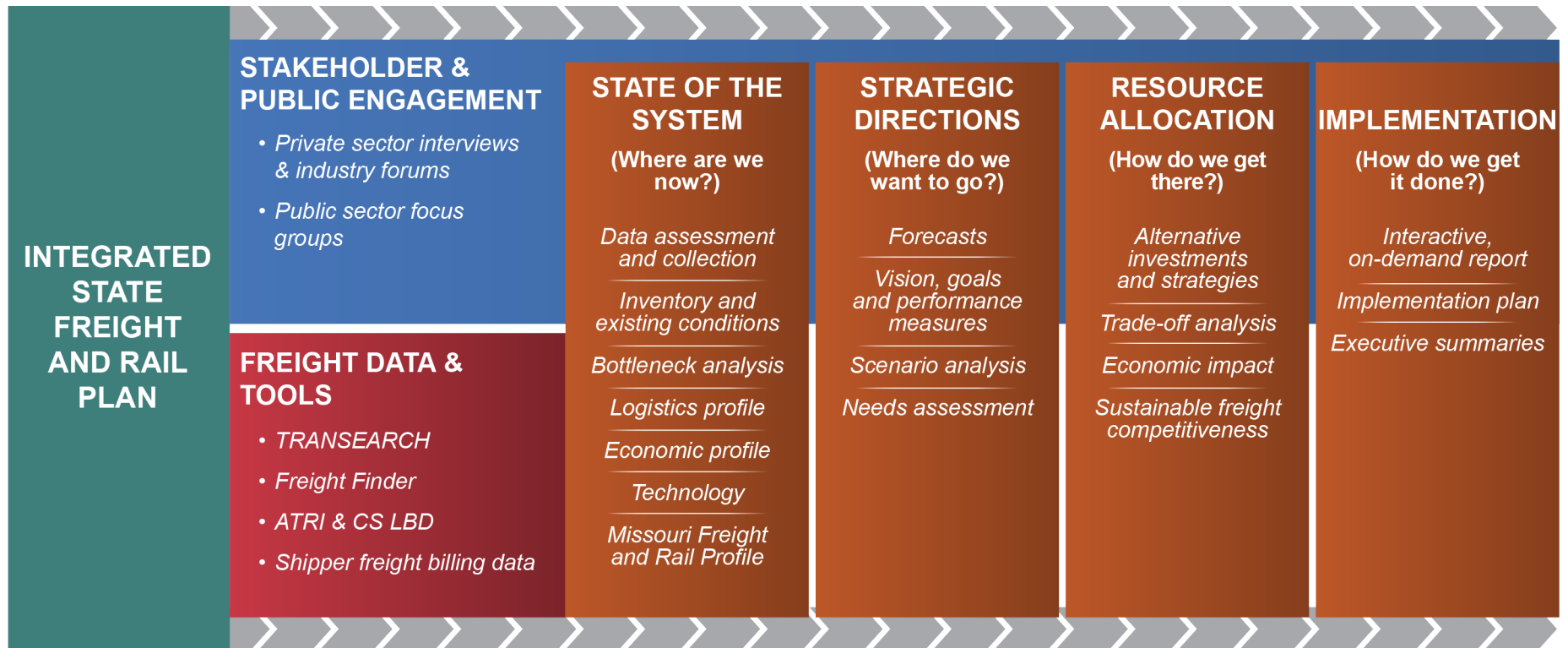


## What is the State Freight and Rail Plan?

Missouri's economic vitality and quality of life are inextricably linked to the state's freight transportation network. The road, railways and other multimodal assets of this network move nearly one billion tons of freight valued at more than one trillion dollars through the state each year.

This State Freight and Rail Plan is a next-generation blueprint with supporting tools to guide investments in the multimodal freight and passenger rail network that will serve Missouri today and well into the future. The SFRP is a deeper dive into the multimodal freight and passenger rail component of the Long Range Transportation Plan. This data-driven and stakeholder-supported plan is intended to help Missouri maintain its competitive advantage and economic vitality aligned with freight movement within the state. Figure 2 shows the overall process for developing the SFRP.

**FIGURE 2. 2022 SFRP PROCESS**





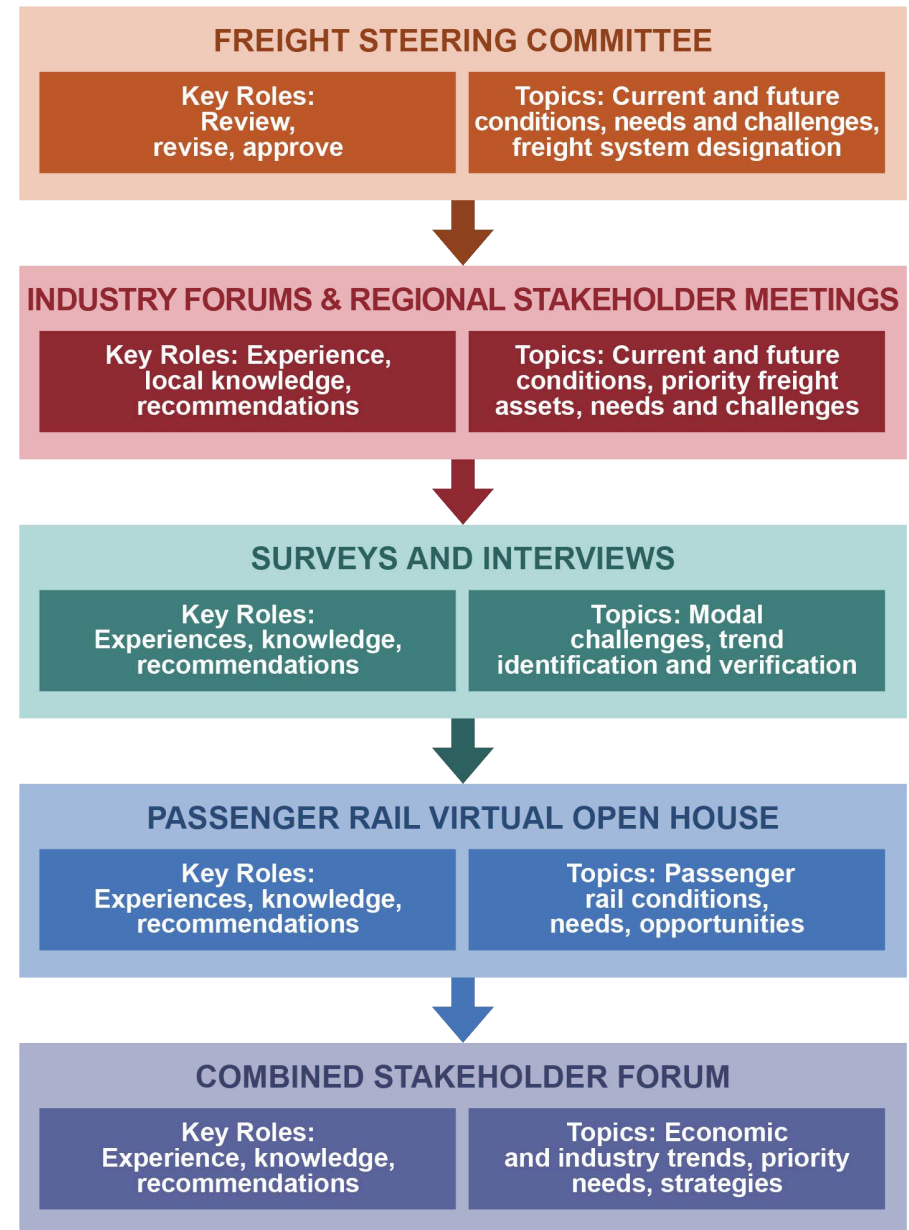
## A Data-Driven, Stakeholder-Informed Plan

MoDOT, in collaboration with a wide range of stakeholders, developed the State Freight and Rail Plan to guide current and future multimodal freight and passenger rail transportation investment strategies in Missouri. All meetings were conducted virtually and included the following:

- Missouri Freight Steering Committee
- Missouri Rail Passenger Advisory Committee
- MoDOT districts and divisions
- Metropolitan Planning Organizations
- Regional Planning Commissions
- General public
- Partners in neighboring states, such as Kansas and Illinois



A full summary of the outreach conducted for the 2022 SFRP is available in the **Stakeholder Outreach Summary Report**.



## Missouri's Freight and Rail Vision and Goals

MoDOT developed a freight vision, goals and objectives to meet the state's growing need to compete globally for quality jobs and to provide safe and efficient mobility of people and goods. The goals and objectives are consistent with MoDOT's pillars (Figure 3), and they were informed by stakeholder outreach and national best practices. They build on previous MoDOT planning efforts, including the 2012 State Rail Plan, 2017 State Freight Plan and 2018 Long Range Transportation Plan. The goals and objectives provide the foundation for multimodal freight and passenger rail investment decision-making.

**FIGURE 3. MODOT'S CORE VALUES**



The goals established as part of the 2022 SFRP will direct MoDOT's vision and direction for the future of the freight system as well as its passenger rail system. As the state's first integrated state freight and rail plan, the 2022 SFRP must build upon the goals established in previous plans to capture all the desired outcomes for the multimodal freight system and passenger rail network.

## 2022 SFRP Goals and Objectives – SAFETY

**SAFETY:** Improve **SAFETY and SECURITY** of the multimodal freight and passenger rail system by supporting efforts to decrease the number and severity of freight vehicle crashes, increase truck parking options and improve safety throughout the multimodal freight system and the passenger rail network.



- Decrease the number and severity of crashes involving commercial motor vehicles.
- Improve grade crossing surfaces, utilize warning devices and pursue road closures and grade separations where appropriate.
- Support the safe movement of maritime and aviation freight.
- Promote the safe transportation of hazardous materials.
- Support cooperative efforts with Amtrak and freight railroads to enhance the security of passenger and freight operations.
- Support the maintenance and development of safe and secure truck parking facilities for commercial vehicle drivers.





## 2022 SFRP Goals and Objectives – SERVICE

**CONNECTIVITY AND MOBILITY:** Improve the **CONNECTIVITY and MOBILITY** of the multimodal freight and passenger rail system by reducing congestion on the roadways; increasing the reliability of the roadways and passenger rail network; supporting improved efficiency of rails, waterways and airports and improving connections between freight modes and between passenger rail and other passenger travel modes.



- Support the development of intermodal freight facilities to increase connectivity between air, rail, truck and water modes to increase access to domestic and global markets.
- Reduce congestion and increase reliability on roadways and freight intermodal connectors, including connections to freight generators.
- Support and encourage improved efficiency of railroads, waterways and airports.
- Support intermodal connectivity between intercity passenger rail and other passenger modes including air, local transit, auto, intercity bus and non-motorized transportation to facilitate efficient and reliable passenger mobility.
- Support new and enhanced passenger rail service to Missouri communities and travelers as an efficient and cost-effective mobility alternative.
- Reduce passenger rail travel times through increased speeds and reduced delays.
- Improve passenger rail reliability and performance.
- Increase frequencies on the existing rail route.

- Support the connectivity of Missouri passenger rail service to other corridors regionally, nationally and internationally to maximize network benefits in terms of increased ridership, revenues and mobility.



**EQUITY AND ENVIRONMENTAL RESILIENCY:** Support **EQUITY and ENVIRONMENTAL RESILIENCY** of the multimodal freight and passenger rail system.

- Support opportunities for alternative fueling infrastructure.
- Support expanded multimodal freight and passenger rail service as a part of an overall state energy conservation policy to protect Missouri travelers and shippers from the adverse mobility and economic impacts of expected increases in future transportation energy costs.
- Support expanded multimodal freight and passenger rail service as a means of reducing carbon emissions and fuel consumed per ton- and per passenger-mile and increasing the resiliency and redundancy of the system against extreme weather events.
- Increase passenger rail accessibility to low income, elderly and special needs groups who have limited access to auto and other modes.



**CUSTOMERS AND PARTNERSHIP:** Improve **COORDINATION and COLLABORATION** with regional planning partners and multimodal freight and passenger rail stakeholders.

- Provide a satisfactory ridership experience for passenger rail customers.
- Regularly and meaningfully engage with multimodal freight and passenger rail stakeholders, industry and planning partners.

## 2022 SFRP Goals and Objectives – STABILITY

**MAINTENANCE: MAINTAIN** the multimodal freight and passenger rail system in good condition by keeping highways and bridges in good condition and supporting the maintenance of railways, waterways, airports and multimodal connections.



- Keep Missouri highways and bridges in good condition.
- Support and encourage the maintenance of railways, waterways, airports and multimodal connections.

**ECONOMY: Support ECONOMIC GROWTH and COMPETITIVENESS** in Missouri through strategic improvements to the multimodal freight network and passenger rail system.



- Enhance and support opportunities for economic development, business expansion and attraction and job growth through improvements to the multimodal freight system.
- Promote multimodal freight service, infrastructure improvements and intermodal connectivity to increase the efficiency of multimodal freight modes, lower transportation costs for Missouri businesses and provide increased access to global markets.
- Enhance resiliency and develop redundancy for the multimodal freight and passenger rail system to increase reliability for movement of passengers and freight.
- Provide enhanced passenger rail service to Missouri communities as a part of an overall economic development strategy to increase

employment, household incomes and property values based on the increased accessibility and mobility.

- Leverage federal and state dollars through discretionary funding opportunities to deliver critical multimodal freight and passenger rail infrastructure investments.



**PROCESS AND INNOVATION:** Institute policies and practices that support the multimodal freight and passenger rail systems, encourage **INNOVATION** and promote an efficient use of resources.

- Support the efficient use of resources in multimodal freight and passenger rail planning efforts.
- Encourage the use of technology to improve the safety, efficiency and accuracy of multimodal freight and passenger rail planning efforts.





SECTION

2

# Missouri's Freight and Rail Story Today





## Chapter 2: Missouri's Multimodal Freight and Passenger Rail Network

Missouri is at a national crossroads of extensive highway, rail and pipeline networks and enjoys access to global markets from its ports, waterways and airports (see Figure 4). Missouri also has an abundance of natural resources and agricultural commodities, which are sold around the world. Demand to move these goods to market drives the development of a highly capable and robust transportation system that is vital to the industries in the state.

Missouri's unique central location and the high demand for moving goods and commodities to, from and through the state make Missouri a multimodal transportation hub that is well-positioned to serve local, national and global markets. Not only are these transportation capabilities key to fully realizing the economic potential of Missouri business opportunities, but they also offer further economic opportunity due to the significant amount of employment and operations of these sectors. Freight transportation supports all goods-producing and consuming sectors of the economy while also being a leading economic sector.

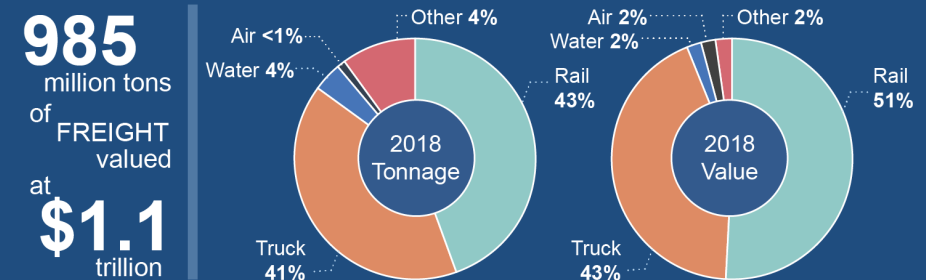
This chapter summarizes key statistics, economic benefits and needs of Missouri's multimodal freight and passenger rail network. A deeper investigation and discussion of each of these modes is available in the **Missouri Freight & Rail Profile – Volumes 1 and 2**. A full analysis of statewide commodity flows is available in the **Commodity Flow Profile**, and the economic impact of goods movement and freight-intensive industries is available in the **Economic Impact of Freight Transportation Report**, both produced as part of the 2022 SFRP.

### MOVING THE GOODS, FUELING THE ECONOMY

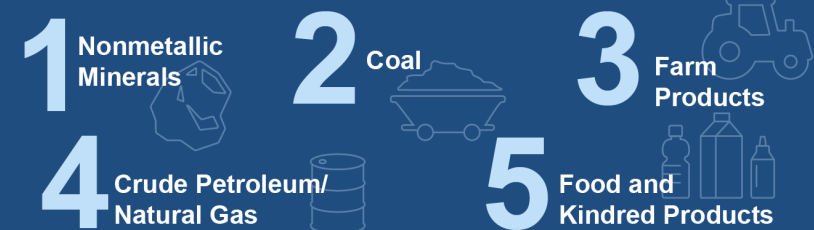
#### Missouri Economy at a Glance, 2018



#### Freight Movement in Missouri, 2018



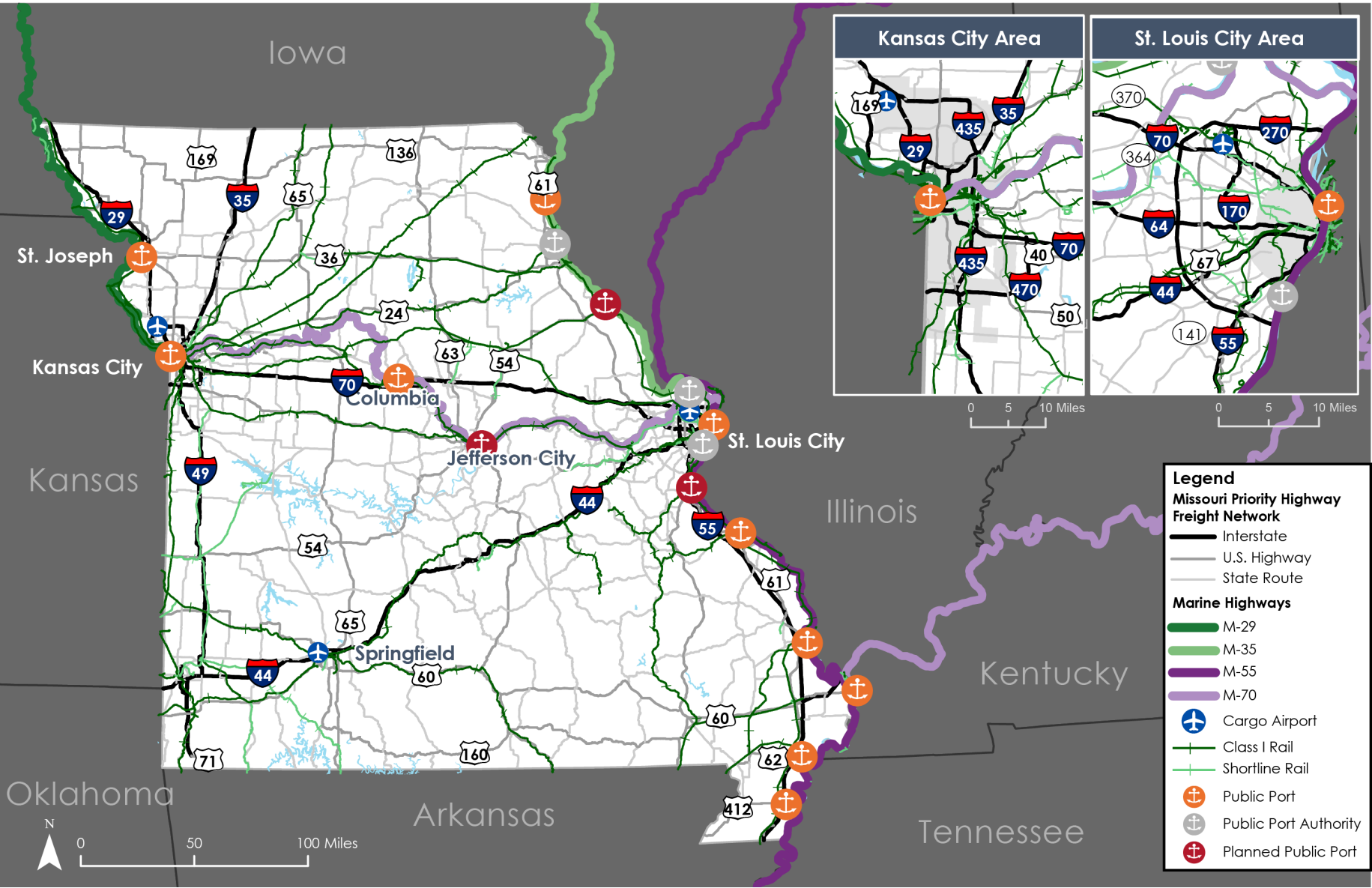
#### Top Five Commodities by Tonnage Moved on Missouri's Multimodal Freight Network



#### Total Statewide Economic Impact of Freight Transportation and Freight-Generating Industries in Missouri



FIGURE 4. MULTIMODAL FREIGHT NETWORK IN MISSOURI



## Highway Freight

### Key Statistics and Features

Highways are the work horse of Missouri's freight network and economy, and the Missouri Priority Highway Freight Network identifies the state's most critical highway assets for freight (Figure 4). MoDOT manages 33,832

**94% of Missouri's interstate highway miles and 89% of U.S. route miles are in good condition.**

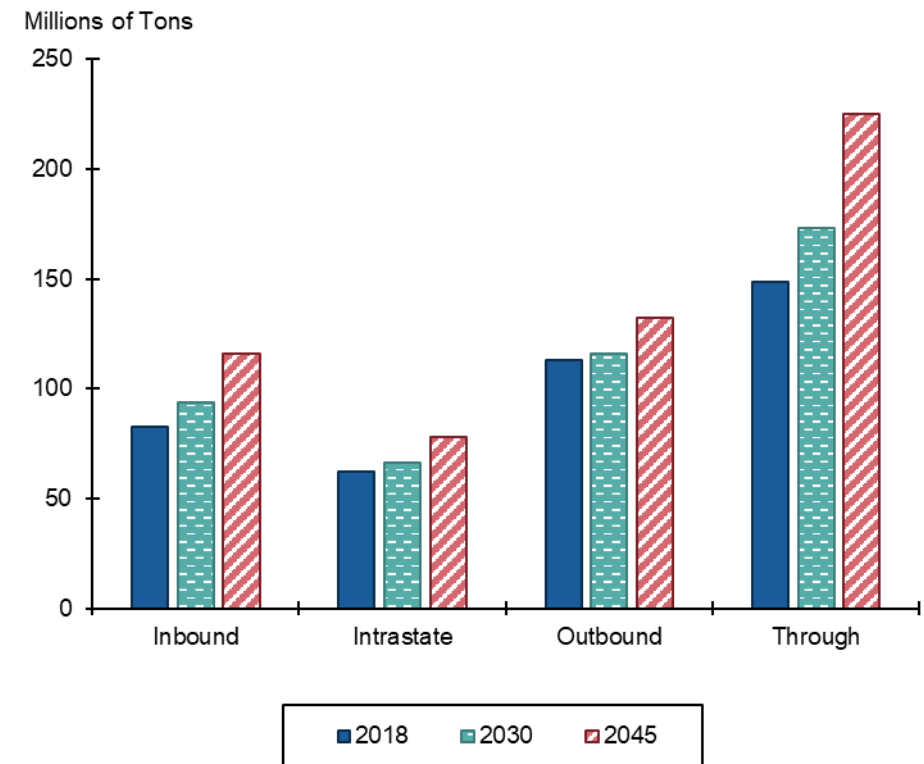
miles of state highway, which ranks 7th nationally in state highway miles. Missouri is home to the 20th and 30th largest metropolitan areas in the country, St. Louis and Kansas City, respectively. Interstates are by far the highest volume highways for truck traffic. The median average annual daily truck traffic for the entire Missouri

interstate system was 8,400 trucks, with a peak of 36,000 on I-70 in St. Louis (between exit 243A and 243C). Across Missouri's interstate system, trucks comprise between 29% and 72% of average annual daily traffic. The maximum percentage of truck traffic is located on I-70 west of Warrenton between exits 188 (Truxton) and 193 (Warrenton).

The high volume of trucks in the state's urban areas does not necessarily translate into trucks as a high percentage of overall traffic. Many of the areas with the highest ratio of trucks are between major urban centers, such as on I-70 between Kansas City and Columbia. Additionally, trucks make up a high percentage of traffic on interstates that connect with surrounding states, such as I-55 near the borders of Kentucky, Tennessee and Arkansas, and I-35 near the border with Iowa.

In 2018, 32.5 million trucks transported more than 400 million tons of freight worth more than \$495 billion on Missouri's highways (Figure 5). Freight traveling through Missouri without stopping accounted for 37% of tonnage and 58% of value of all commodities. By 2045, through movements are projected to make up a larger proportion of freight movements via truck in Missouri, accounting for 41% of tonnage and 65% of the value of all commodities moved by trucks.

**FIGURE 5. TRUCK FREIGHT TONNAGE BY DIRECTION, 2018-2045**



### TOP 3 Highway Commodities BY TONNAGE



### TOP 3 Highway Commodities BY VALUE



Illinois is Missouri's top trading partner for truck freight, accounting for nearly 25% of the combined exported and imported goods. Other neighboring states, such as Kansas, Iowa and Arkansas, account for significant portions of truck trade with Missouri, with Texas having the largest share of any non-neighboring state. By 2045, truck trade is expected to increase across the board, with Texas seeing the highest growth of top trading partners at nearly 45% from 2018 volumes.

### Highway Freight Bottlenecks

Truck bottlenecks are areas where persistent delays occur, resulting in what the Federal Highway Administration describes as "a segment of roadway...having constraints that cause a significant impact on freight mobility and reliability." For MoDOT, the process of identifying bottlenecks

relies in part on using data and metrics to pinpoint areas of persistent congestion and/or unreliability as well as feedback from freight stakeholders identifying where and why delays occur based on their experience. As part of the 2022 SFRP, MoDOT identified three freight bottlenecks to investigate (Figure 6):

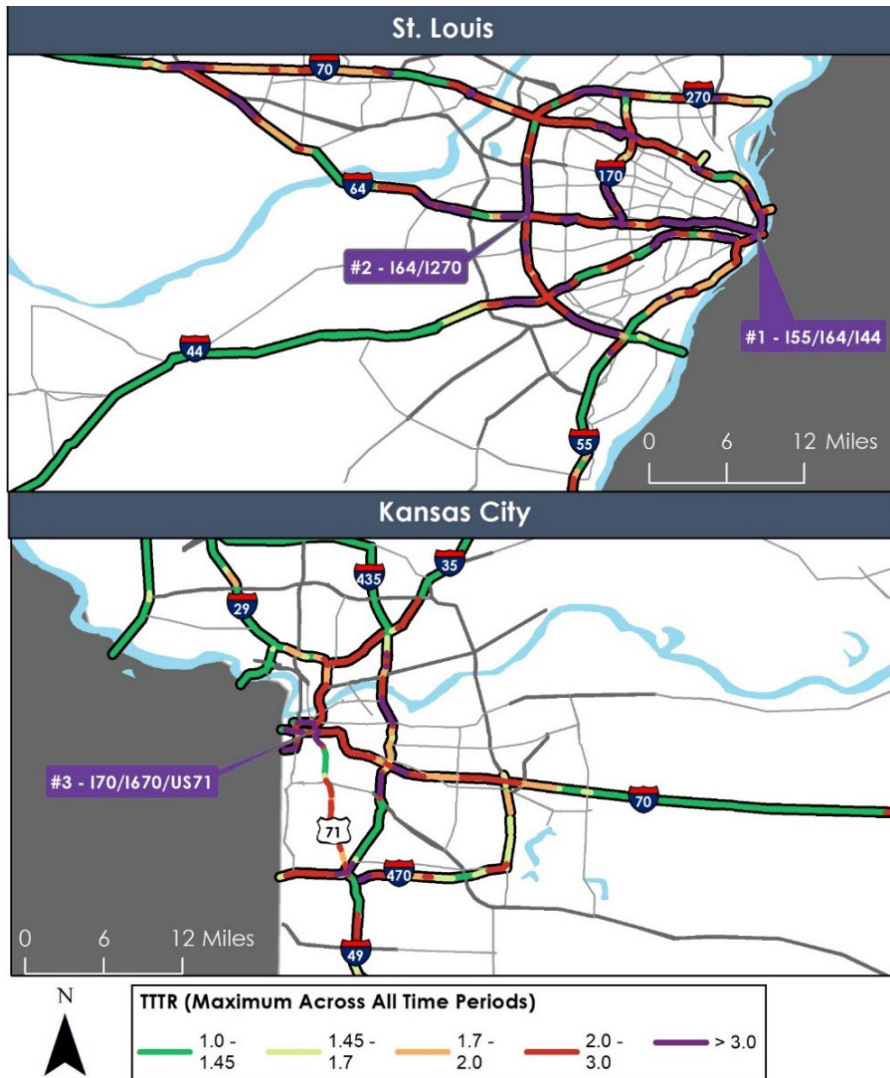
1. The interchange of I-55, I-64 and I-44 near the Poplar Street Bridge (known officially as the William L. Clay Sr. Bridge) in St. Louis
2. The interchange between I-64 and I-270 in western St. Louis County
3. The Downtown Loop interchange between I-70, I-670 and US-71 in downtown Kansas City

The first and third bottlenecks have also been listed as two of the top 100 truck bottlenecks in the country for the year 2019 by the American Transportation Research Institute. Improving the reliability of congested roadways is a priority for MoDOT to improve freight mobility in the state's largest population centers.





**FIGURE 6. TRUCK TRAVEL TIME RELIABILITY FOR THREE TRUCK BOTTLENECK LOCATIONS**



### ECONOMIC IMPACT OF HIGHWAY FREIGHT TRANSPORTATION

The trucking industry benefits the economic and quality of life in Missouri by supporting jobs and delivering consumer goods. Truck transportation, warehousing and storage and support activities directly and indirectly support 117,600 Missouri jobs, \$6.1 billion in labor income and \$8.8 billion in gross state product, giving rise to nearly \$1.9 billion in total tax revenue.

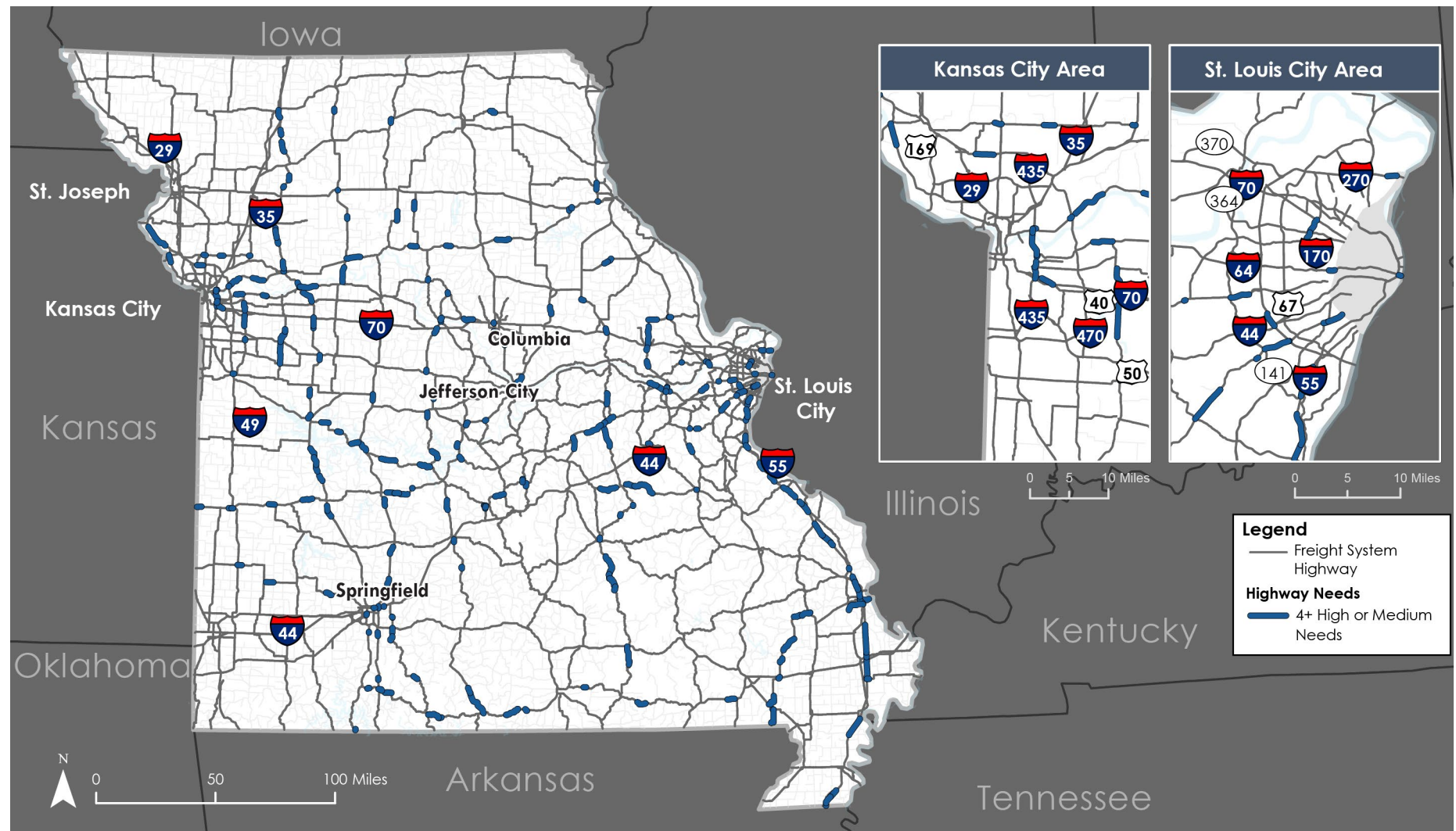
### Highway Freight Challenges and Needs

Identifying freight needs across Missouri's comprehensive highway network used a multivariate scoring process across six needs categories (Figure 7), which were identified based on MoDOT's priorities. Each needs category is comprised of multiple metrics and data sources that calculated a score for that category, as well as all categories combined. The outcome of this data-driven, stakeholder-informed process is a defined level of freight need for each segment of the state's highway system. The Missouri Freight Analysis System (known as MoFAS) tool enables MoDOT to conduct this analysis for any specific region(s) of the state.

**FIGURE 7. HIGHWAY NETWORK FREIGHT NEEDS CATEGORIES**



FIGURE 8. HIGH-NEED SEGMENTS ON MISSOURI'S HIGHWAY FREIGHT SYSTEM



The highest-need freight highway segments in Missouri are those that are identified as high need across four or more needs categories; a number of urban and rural corridors qualify for this designation (Figure 8). Most notably, high-need segments were identified along most of I-55 south of St. Louis, portions of MO-13, MO-19, U.S. 24 and U.S. 54.



## Truck Parking in Missouri

Nearly every item we buy, from clothes to food to electronics, at some point is carried in a truck. Trucks provide the main transportation mode for freight in Missouri, carrying approximately 40% of all freight by weight and 43% by value in 2018. Our constant demand for goods means more trucks on the road and an increased demand for safe, reliable places for drivers to park.

Several factors drive the need for truck parking. The Federal Motor Carrier Safety Administration regulates hours of service. HOS provisions have a significant impact on truck parking because they require drivers to carefully manage delivery schedules and follow strict rules regarding adequate rest, making sufficient parking critical on their routes. Beyond HOS, many other factors influence when and where a driver decides to park. For example, the driver could be carrying a load for a facility with a very strict delivery window (time when the driver can arrive on-site), and carriers can face fines or potentially lose future business if they are not there on time.

The **Truck Parking Profile**, developed as part of the 2022 SFRP, details where truck parking demand exceeds supply across the interstate highway network, as well as locations where trucks sometimes park along interstate right-of-way statewide (Figure 9).

Of the **141**  
**TRUCK**  
**PARKING**  
**SITES**  
near an  
interstate  
in Missouri,

**87** are at or above  
**100% UTILIZATION**  
at the peak hour (2-3 AM)

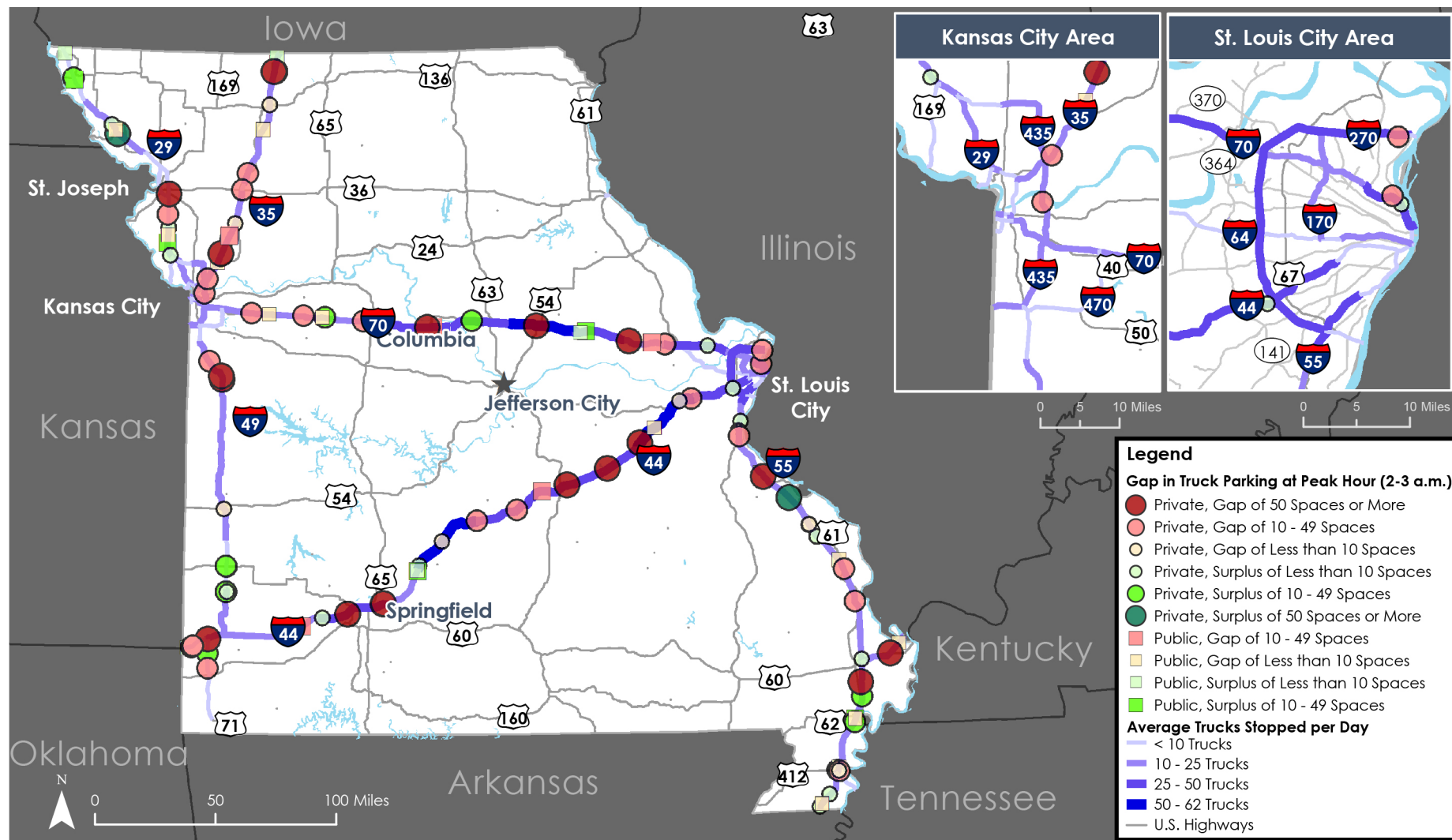
& an additional

**23** are between  
**80% & 100% UTILIZATION.**

Average utilization for the **45 PUBLICLY OWNED SITES** is **118%** versus **120%** at the **96 PRIVATELY OWNED SITES.**



FIGURE 9. TRUCK PARKING GAPS IN MISSOURI



Outreach to truck drivers revealed that there is a lot that Missouri is doing right when it comes to truck parking, including the number of well-maintained rest stops and truck parking facilities along I-44 and I-70. However, there is opportunity to expand truck parking on U.S. highways and other non-interstate freeways and upgrade some site amenities (such as lighting, restrooms and facility design) to better meet the needs of the state's truck drivers.



## Freight Rail

### Key Statistics and Features

Missouri's 5,300 miles of freight railroads play a critical role in the transportation of goods within the state, throughout the country and even across North America. Trains carry the largest share (43%) of freight moving to, from and through Missouri of any mode. Rail transport is one of the most cost-effective means of moving freight and is vital to many of Missouri's key exporting industries.

Railroad corridors serve areas throughout Missouri, with Kansas City and St. Louis – the nation's 2nd and 3rd largest rail hubs, respectively, after Chicago – historically serving as major points for the interchange of rail traffic moving between the eastern and western U.S. Missouri's rail system is operated by six Class I Railroads (see note in call-out box): BNSF Railway, Canadian Pacific, Kansas City Southern, Norfolk Southern, Union Pacific and CSX; six local railroads that provide line-haul service separate from Class I Railroads; and 10 switching and terminal railroads. Missouri also has 141 intermodal facilities integrating rail with barge, truck and air modes. These facilities reduce cargo-handling time, thereby increasing efficiency in transporting goods.

#### CANADIAN PACIFIC KANSAS CITY

In December 2021, Canadian Pacific completed its acquisition of Kansas City Southern, forming Canadian Pacific Kansas City. CPKC would provide the first single-line connection between the U.S., Canada and Mexico. If the Surface Transportation Board formally approves the transaction (expected Q4 2022), the railroads expect to achieve full integration over the course of three years.

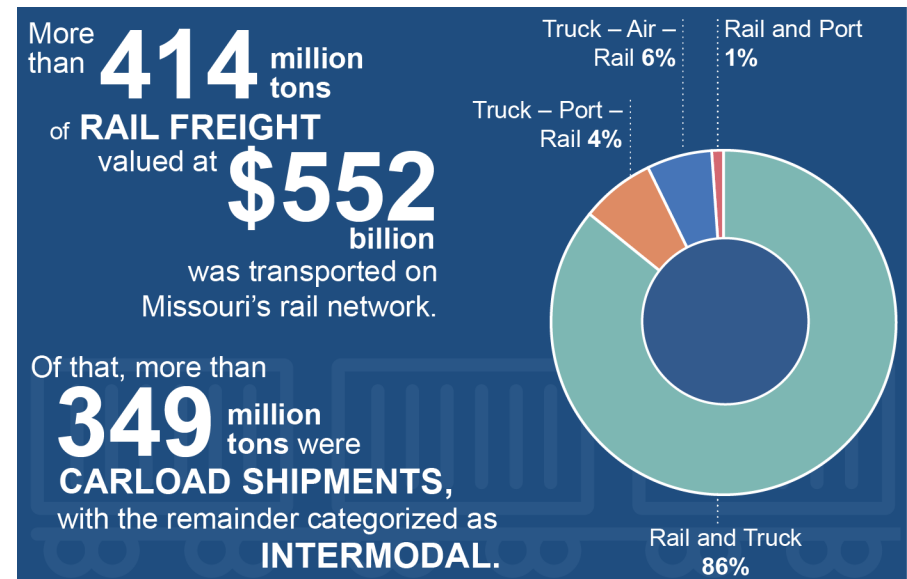
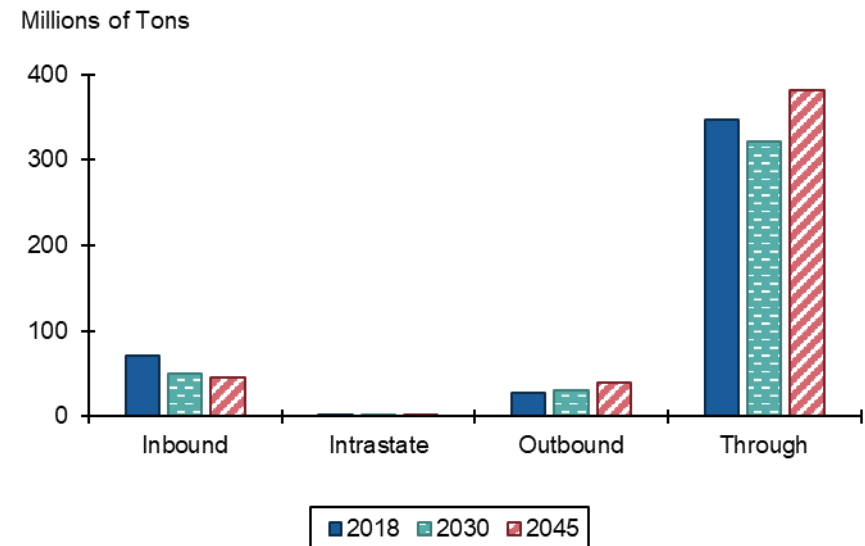


FIGURE 10. RAIL FREIGHT VOLUME BY DIRECTION, 2018-2045



**TOP 3** Rail Commodities **BY TONNAGE****TOP 3** Rail Commodities **BY VALUE**

Through freight dominates the state's rail flows. This is expected to continue, growing from 75% of rail freight tonnage in 2018 to 81% by 2045 (Figure 10).

**NATIONALLY, MISSOURI RANKS (2019):**

- 5<sup>th</sup>** in freight rail employment
- 11<sup>th</sup>** in total rail miles
- 12<sup>th</sup>** in terminated rail tons & carloads
- 21<sup>st</sup>** in originated rail carloads
- 24<sup>th</sup>** in originated rail tons

The demand for freight rail is driven by the efficient movement rail provides for various commodities. Carload shipments are typical for raw materials such as coal or grain that are moved in large quantities, whereas intermodal shipments tend to be products that rely on trucks to connect freight shipments with rail facilities or final destinations. Bulk commodities – raw unpackaged materials – are well suited for rail travel and represent a majority of the freight rail tonnage traversing Missouri's rail network. While accounting for just 16% of rail freight in 2018, intermodal shipments over the Missouri rail network were valued at approximately \$286 million, or 52% of all rail freight.

The top domestic freight rail trading partner for shipments terminating in Missouri is the nation's leading coal producer, Wyoming. Freight originating in Wyoming and terminating in Missouri comprised nearly 69% of Missouri's freight rail imports in 2018. However, Wyoming's share is expected to decline precipitously by 2045 due to a projected drop-off in coal movements. Additionally, the automobile industry is a major employer within Missouri, and vehicles manufactured in the state are often shipped to other states for eventual export to international destinations. Top trading partners receiving freight rail shipments from Missouri are Texas, California and Illinois.

**ECONOMIC IMPACTS OF FREIGHT RAIL TRANSPORTATION**

The railroad industry benefits the economic well-being of Missouri. The rail transportation sector directly and indirectly supports 4,350 Missouri jobs, \$347 million in labor income and \$687 million in gross state product, giving rise to \$119 million in total tax revenue.

### WHAT'S HAPPENING WITH COAL?

Missouri's freight rail network is critical in transporting coal from western states to the eastern portion of the country and for supplying the state's coal-burning power plants. Coal has been the number one commodity by weight shipped over the state's rail system, year after year. The rail network imported nearly 47 million tons of coal into Missouri in 2018 alone, constituting 68% of all rail-transported imports by weight.

Coal imports have declined nationwide since 2012. However, Missouri is still dependent on coal to produce power at the state's 11 coal-fired power plants, all of which receive shipments via the freight rail network. The reduction in coal moving across Missouri's rail network provides an opportunity for shipments of other goods well-suited for rail freight transportation.

### Freight Rail Challenges and Needs

Freight rail needs and opportunities are determined by supply chains and goods movement within the state. The condition and capacity of existing rail infrastructure affects the quantity and speed at which goods can be moved. The availability of rail transportation provides significant efficiencies for Missouri's people and businesses, offering an attractive mode for freight capable of moving high volumes in a cost-efficient manner across long distances. The state has a significant economic stake in the preservation and maintenance of the rail network and services.

Several of Missouri's railroad corridors are close to or are exceeding capacity (Figure 11). These corridors represent segments that currently exceed capacity (LOS F) or that may exceed capacity in the future if trends continue (LOS E). All other corridors in Missouri are operating at an LOS of C or better with additional capacity available for freight.

In Missouri, rail moves critically important goods such as coal, grain and motor vehicle parts. By monitoring the needs of the railroad network, MoDOT develops solutions and recommendations to ensure the freight rail network continues performing its essential duty. Other identified freight rail needs include:

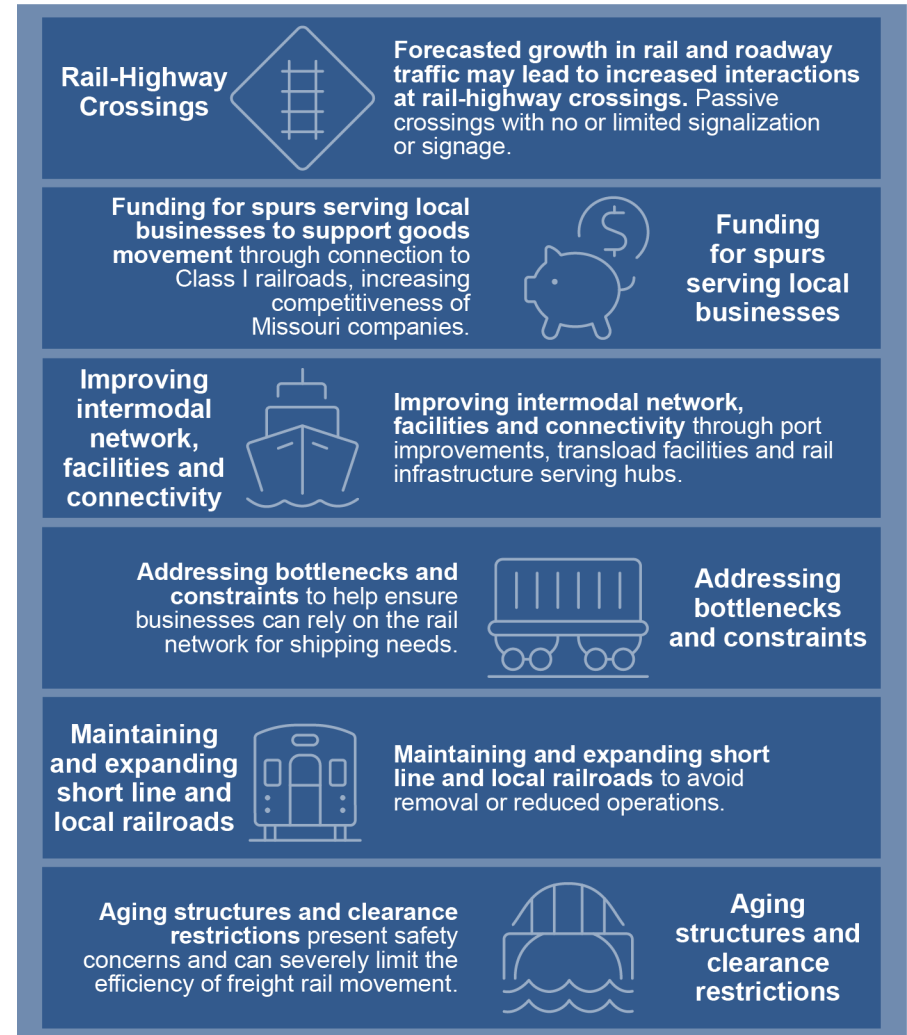
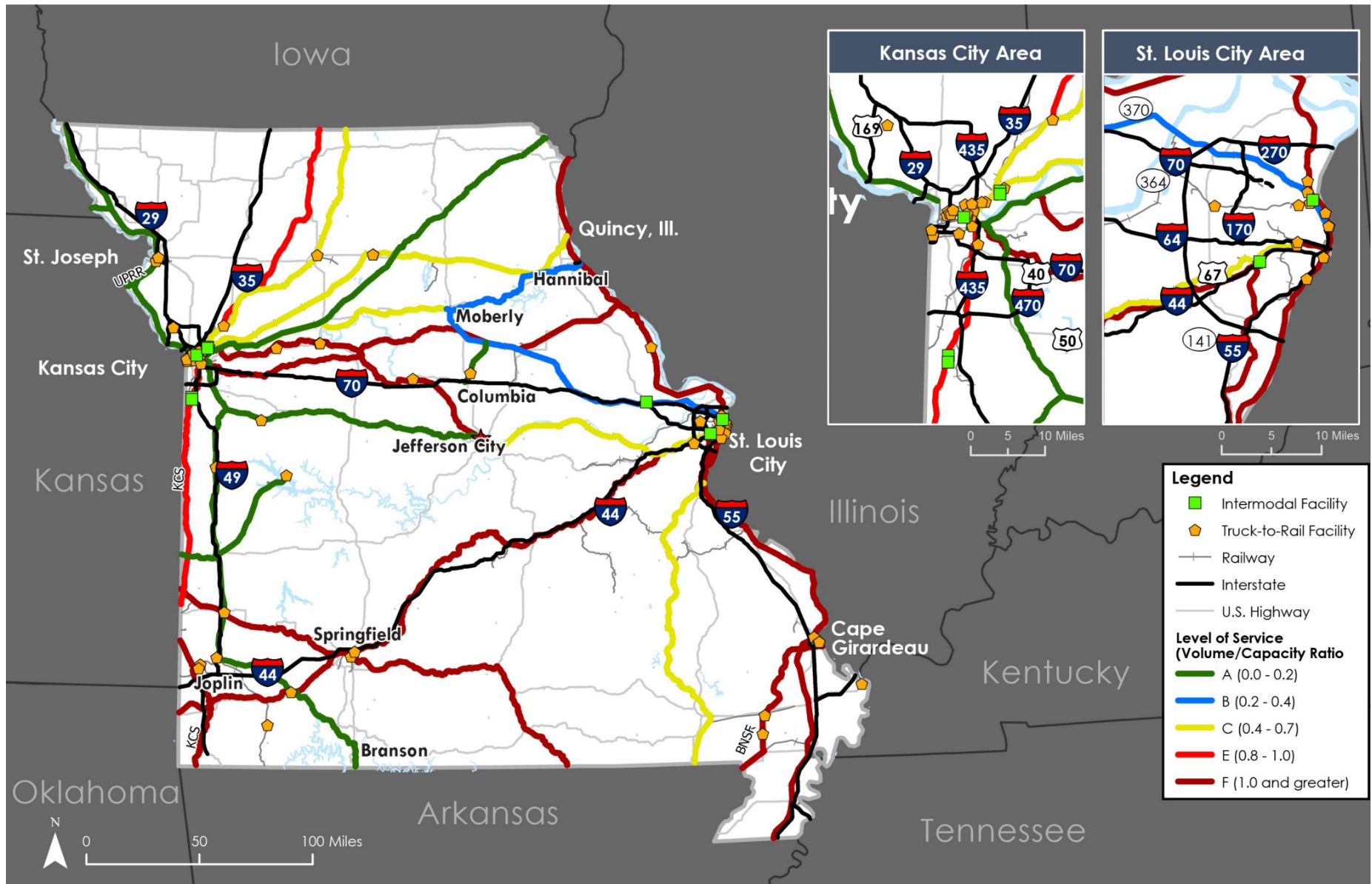


FIGURE 11. RAILROAD EXISTING LEVEL OF SERVICE





## Passenger Rail

### Key Statistics and Features

**82% of  
Missourians live  
within 60 miles of  
a passenger rail  
station.**

Passenger rail service provides an option for connecting rural communities and smaller cities to major economic centers and promotes commerce and economic development, particularly in the areas surrounding stations. Amtrak passenger rail service in Missouri, via two long-distance routes and the state-

supported *Missouri River Runner*, connect large urban centers to outlying suburbs and smaller communities in the interior of the state (Figure 12). Additionally, the *Lincoln Service*, a state-supported route funded by Illinois, connects Chicago with St. Louis—the only Missouri stop.

The *Missouri River Runner* Amtrak passenger train route operates two round trips per day across 283 miles of track between the Gateway Transportation Center in St. Louis and Union Station in Kansas City, providing connection to the Southwest Chief and Texas Eagle routes. The *Missouri River Runner* provides an alternative travel mode along the heavily traveled I-70 corridor between St. Louis and Kansas City.

The passenger rail routes servicing Missouri cover a wide range of the state, providing a transportation option for leisure and business travelers who do not have access to an automobile or prefer train service.

**AMTRAK RIDERSHIP**  
peaked at more than **360,000**  
boardings and alightings  
—passengers getting on or off the train—  
at St. Louis station in **FY2018**.

FIGURE 12. MISSOURI PASSENGER RAIL NETWORK



## Economic Benefit of Passenger Rail Service

Many Missouri residents and visitors depend on non-highway modes of transportation. Enhanced passenger rail service provides important economic development benefits to Missouri communities by improving accessibility, connectivity and travel efficiency for both in-state and out-of-state travelers.

Notably, the *Missouri River Runner* provides an alternative travel mode along the heavily traveled I-70 corridor between St. Louis and Kansas City and gives rise to significant benefits in Missouri through travel/transportation, reduced energy consumption, safety and tourism/visitor spending.



Additional benefits of the *Missouri River Runner* include cost savings for residents, businesses and government. Missouri residents and visitors enjoy \$6.5 million in annual transportation cost savings each year because of the *Missouri River Runner* service. Other cost savings linked to the service include \$1.4 million in annual savings associated with a reduced fatality rate and \$160,000 in annual savings resulting from less wear and tear on Missouri roadways. Additionally, travelers on Missouri passenger rail services increase the economic development potential of station area land. Passenger service can also have a positive impact on the environment as moving trips from other modes to rail, emissions per passenger mile is reduced.

## Passenger Rail Challenges and Needs

Missouri maintains existing *Missouri River Runner* service with relatively modest state appropriations. Other passenger rail needs include:



**Missouri has no dedicated funding source for passenger rail.** Funding is subject to legislative general revenue appropriation each year and this investment has not kept pace with inflation of the cost to operate the service.

**Improving connection for Missouri communities** that are either not served by passenger rail or have limited service.



**Improving infrastructure of existing passenger rail routes** including sidings, capacity constraints and bottlenecks to ensure efficient operations.

**Upgrading or developing new train stations** to improve the ridership experience for passengers.



**Providing better service, operations and marketing** of existing service.

## Air Cargo

### Key Statistics and Features

Air cargo is vital to Missouri's freight network, allowing for high-value freight to be moved over long distances in a short amount of time and for the state to compete with other air-served freight markets. With major national and international airports that distribute cargo, Missouri is an air cargo origin and destination point of freight shipments for national and international locations.

#### MISSOURI CARGO AIRPORT RANKINGS

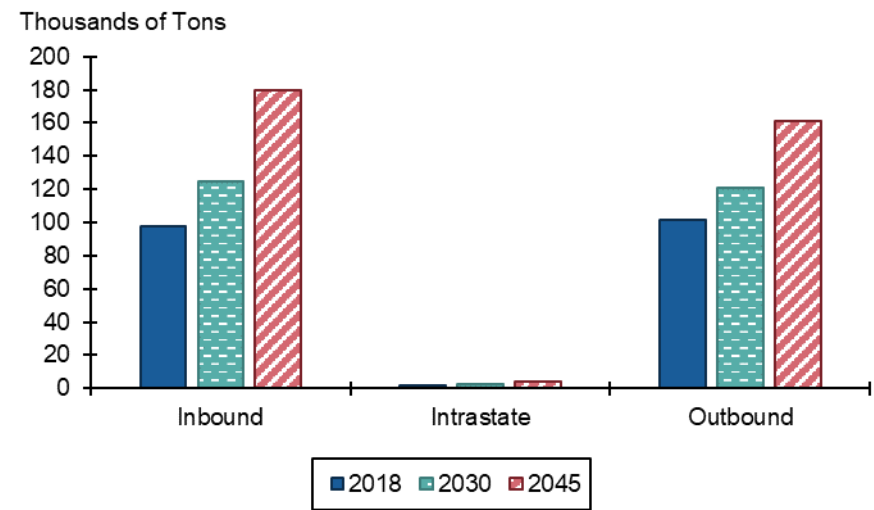
2018 TONNAGE by airport	<b>MCI</b> 106,211	<b>STL</b> 74,270	<b>SGF</b> 15,307
2018 NORTH AMERICAN RANK	<b>47<sup>th</sup></b>	<b>62<sup>nd</sup></b>	<b>111<sup>th</sup></b>
2018 GLOBAL RANK	<b>181<sup>st</sup></b>	<b>222<sup>nd</sup></b>	<b>436<sup>th</sup></b>

The three largest air cargo facilities and distributors in Missouri transported 99.9% of total air cargo tonnage in the state: Kansas City International (MCI), St. Louis Lambert International (STL) and Springfield-Branson National (SGF). All of these airports are located near large- or medium-sized metro areas. Facilities located near major metro areas are generally larger in size and capacity and proximate to population centers, which enables them to support greater volumes of freight and mail.

More than  
**201,000** tons valued at **\$22** billion  
were handled at  
**MISSOURI AIR CARGO FACILITIES**  
in **2018**, equating to nearly  
**\$109,000** per ton.

Air cargo services are most frequently used to move high-value, low-weight commodities and time-sensitive goods. Air cargo trade in Missouri is fairly balanced; the amount of goods entering and exiting the state are roughly valued at the same price and volume (Figure 13). By 2045, overall air freight activity is expected to increase 71% by tonnage and 90% by value.

FIGURE 13. AIR FREIGHT VOLUME BY DIRECTION, 2018-2045





**TOP 3** Air Commodities **BY TONNAGE****82**  
thousandSmall packaged  
freight shipments**19**  
thousandTransportation  
Equipment**15**  
thousandElec. Mach.  
Equip. &  
Supplies**TOP 3** Air Commodities **BY VALUE****\$6**  
billionMisc. Manufacturing  
Products**\$5**  
billionTransportation  
Equipment**\$4**  
billionElectrical Machinery  
Equipment & Supplies**ECONOMIC IMPACT OF AIR CARGO**

The airline industry benefits the economic well-being of Missouri. The air transportation sector directly and indirectly supports 1,120 Missouri jobs, \$73 million in labor income and \$164 million in gross state product, giving rise to \$49 million in total tax revenue.

Air cargo has been particularly impacted by strong and consistent growth of e-commerce activity over the past decade, which has only intensified during the COVID-19 global pandemic. Expedited carriers are critical linkages in the transport of e-commerce goods, comprised of smaller companies contracting with FedEx, UPS and Amazon to transport air cargo statewide with ground and air modes. These companies are particularly important to rural areas, using primarily small planes to deliver letters and packages to/from the metro hubs. For e-commerce parcels, expedited carriers often contract with Amazon/Prime, for example, to deliver goods.

Memphis, Tenn., Louisville, Ky., Indianapolis, Ind. and Rockford, Ill. are the top origins and destinations of air cargo. The locations of top origin and destination airports are due in part to being close to other FedEx or UPS hubs.

**MISSOURI'S TOP  
AIR CARGO  
CARRIERS**

FedEx | UPS



## Air Cargo Challenges and Needs

The air cargo industry has experienced two significant global economic recessions in the last 15 years. The economic recession of 2008 negatively impacted both air passenger and cargo, whereas the COVID-19 pandemic appears to have only negatively affected passenger travel and positively affected air cargo.

There are several ways to support opportunities for air cargo growth in Missouri. Although capacity exists at airports in Missouri, it will be important to expand access to reach more parts of the state and provide service for highly time-sensitive commodities produced in Missouri. The top time-sensitive commodities, such as transportation equipment and chemicals, are well suited for air cargo transport and could take advantage of increased air cargo access to grow its manufacturing and distribution base within Missouri and across the United States. Missouri air cargo needs can be categorized into three areas:



### Airport Access



**Air cargo access is critical to economic vitality, particularly for high value commodities.** Missouri airports must ensure seamless access to air cargo facilities via the roadway network to stay competitive with other freight modes. I-70 congestion and reliable, efficient access from the airport to the freight highway network is an example of an airport access need.

### There are opportunities for Missouri's airports to improve facility infrastructure on-site.

This includes runway and taxiway expansions, cargo aircraft aprons and more space for commercial vehicle staging. SGF has identified cargo apron, ramp and facilities expansion for aircraft movement and storage as examples of airport facility needs.



### Industrial Development



**Focusing industrial development around airports can help increase the value of air cargo services.** There are opportunities to increase industrial development around all three major Missouri airports. At MCI, growth in air cargo volumes has indicated a need for industrial development infrastructure at KCI Intermodal Logistics Center and an open ground on the west side of the runway.

## Ports and Waterways

### Key Statistics and Features

Marine transportation is critical to the health of Missouri's economy. Missouri industries including agriculture, chemical manufacturing, aggregates and metals rely on the state's extensive port and waterway network to receive raw materials and to move goods to market. Barges traveling on the Mississippi and Missouri rivers provide shippers with access to one of the most economical and environmentally friendly transportation modes available. Additionally, because it has a dedicated throughway, water transportation is an attractive alternative for the movement of goods compared with highways and rail for many commodities.



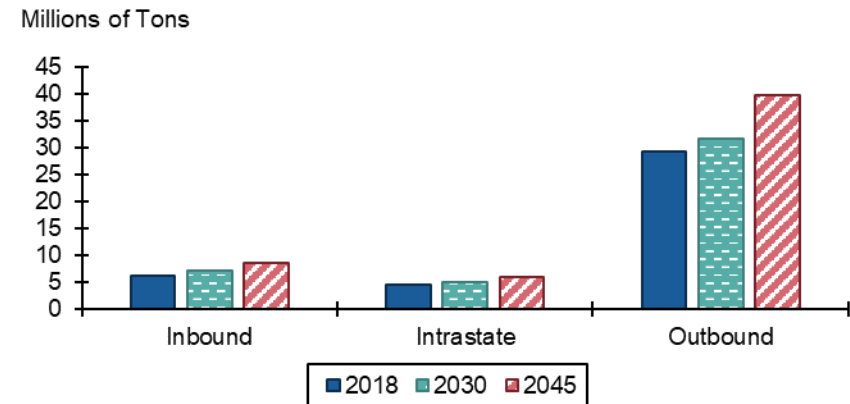
Missouri's waterways make up a distinct and often dedicated path of goods movement that supports a significant amount of freight movement. Missouri occupies a central location in the inland waterways of the

marine highway system, with direct access to the Mississippi and Missouri rivers. There are 16 active public port authorities along the marine highways in Missouri in addition to hundreds of private dock facilities. These waterways connect the state to the entire Mississippi River system and its tributaries, including the Ohio, Tennessee and Illinois rivers. They also provide connections to Gulf Coast ports such as New Orleans and Mobile, providing Missouri shippers with access to global markets.

In 2018, Missouri's waterways transported nearly 40 million tons of commodities valued at \$7.6 billion to and from the state (Figure 14); however, there were over 630 million tons of through traffic on the

Mississippi River in 2019, making Missouri's waterways an essential part of the state, regional and national freight economy with connections to domestic and global markets.

**FIGURE 14. WATER FREIGHT VOLUME BY DIRECTION, 2018-2045**



### TOP 3 Water Commodities BY TONNAGE



### TOP 3 Water Commodities BY VALUE



Louisiana is Missouri's top trading partner for goods transported into and out of the state's ports, comprising 54% of all goods in 2018. Waterborne freight flows between Missouri and Louisiana is primarily comprised of bulk shipments that are transferred to/from container ships to/from international



markets. Illinois is the state's second largest trading partner for goods transported via water, with Tennessee following closely behind.

### ***Economic Impact of Ports and Waterways***

The ports and waterways industry benefits the economic well-being of Missouri. A 2017 MoDOT study also found that Missouri's public ports support nearly 290,000 jobs annually, resulting in nearly \$15.7 billion in labor income and more than \$100.6 billion in annual economic activity. **About 34% of Missouri's economy and one out of every ten jobs is supported by the ports.** This economic activity results in expansion of the state and local tax base, and Missouri ports give rise to more than \$2.4 billion in state and local tax revenue annually. Missouri's port users can be categorized as:

- **Port-dependent users**, or industries who produce various commodities and use marine transportation as one mode to receive necessary production inputs and/or bring their products to market. In Missouri, those industries include crop production, nonmetallic mineral products manufacturing, transportation equipment manufacturing and mining (except oil & gas).
- **Port-benefitted users**, or those that benefit from the reduced freight costs that result from marine transportation. The five largest sectors that benefit from port activity are construction of buildings, heavy and civil engineering construction, plastics and rubber products manufacturing, machinery manufacturing and computer and electronic product manufacturing.

### ***Ports and Waterways Challenges and Needs***

Based on an evaluation of previous studies, technical analysis and stakeholder outreach, the following themes emerged for Missouri's port and waterways needs:

**Most of the locks and dams on the Mississippi River are close to 100 years old.** In addition, many are undersized and cannot accommodate a standard 15-barge tow.

#### **Aging Infrastructure**



#### **Environmental Sustainability and Resiliency**



**Changing water levels and river conditions impact operations, affecting costs and reliability.** Natural hazards can also damage port facilities, as shown by widespread flooding in 2019.

**Many ports have potential to better interface with rail, pipeline, and highway modes.** Investment in these components could lead to a significant return on investment and could support emerging port activities, such as container on barge service.

#### **Intermodal Connectivity**



#### **Emerging Port Development**



**Missouri has many ports that are in early stages of development or being revitalized after a period of underutilization.** Investment could help these ports reach their development potential.

**Coal is projected to decline significantly in the long-term, while agricultural commodities like grain and livestock feed are projected to increase over the same period.** Shifting commodity trends will impact future port demand.

#### **Decline in Coal and Increase in Agricultural Commodities**





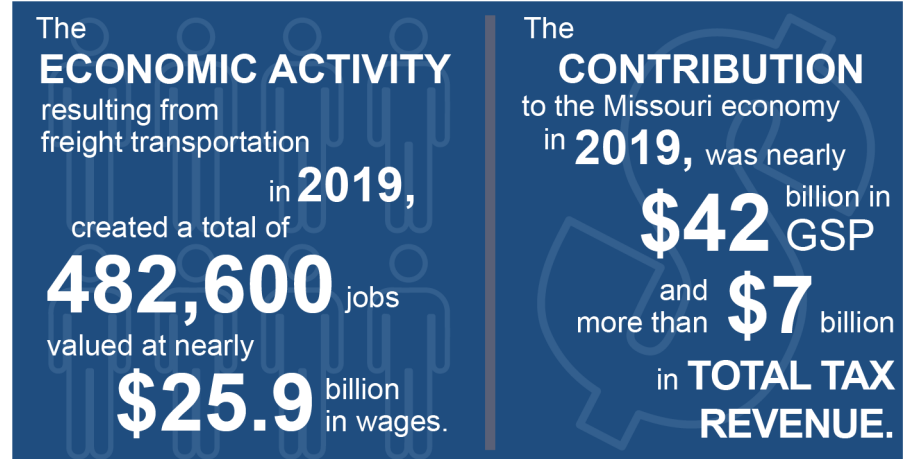
## Chapter 3: Freight Transportation and Missouri's Economy

There is a strong correlation between the amount or value of freight shipped and the overall health of a state or regional economy. The freight transportation system is how Missouri's most important exports are delivered to markets and consumers around the world. Freight movement is vital to the state and increases in freight transportation are directly related to increases in economic growth.

Efficient freight transportation in Missouri is essential for industry supply chains. Supply chains are the pathways that raw materials and products move on from their origin through production and ultimately to end consumers. In recent decades, efficient global freight systems have led supply chains to become highly complex and sophisticated, often sourcing inputs from a variety of countries and origins to minimize production costs and maximize profits.

The COVID-19 global pandemic has exposed critical weaknesses in the supply chains for goods sourced and manufactured all over the world, resulting in ongoing supply chain disruptions, product shortages and sharp changes in how manufacturers, suppliers and retailers conduct business across the globe. Now more than ever, it is critically important for MoDOT to support a resilient multimodal freight transportation system that addresses current and future freight and supply chain issues, as well as challenges associated with extreme weather and other natural hazards.

Freight transportation supports every household and business sector in the Missouri economy. All the raw materials for goods production and finished goods are distributed by freight transportation firms.



## Freight Generators

Freight movements are a derived activity based on the location of the sources of production for raw materials and intermediate goods and the consumption of those goods within an economy. Freight-generating industries in Missouri include:

**Agriculture and forestry**

**Mining, quarrying and oil & gas extraction**

**Manufacturing**

**These three sectors account for roughly 16% of total employment in Missouri.** As producers of freight, these sectors are primarily engaged in growing crops, raising livestock, poultry or fish, harvesting timber, , extracting mineral solids, liquids and gases from the earth or the transformation or assembling of materials.

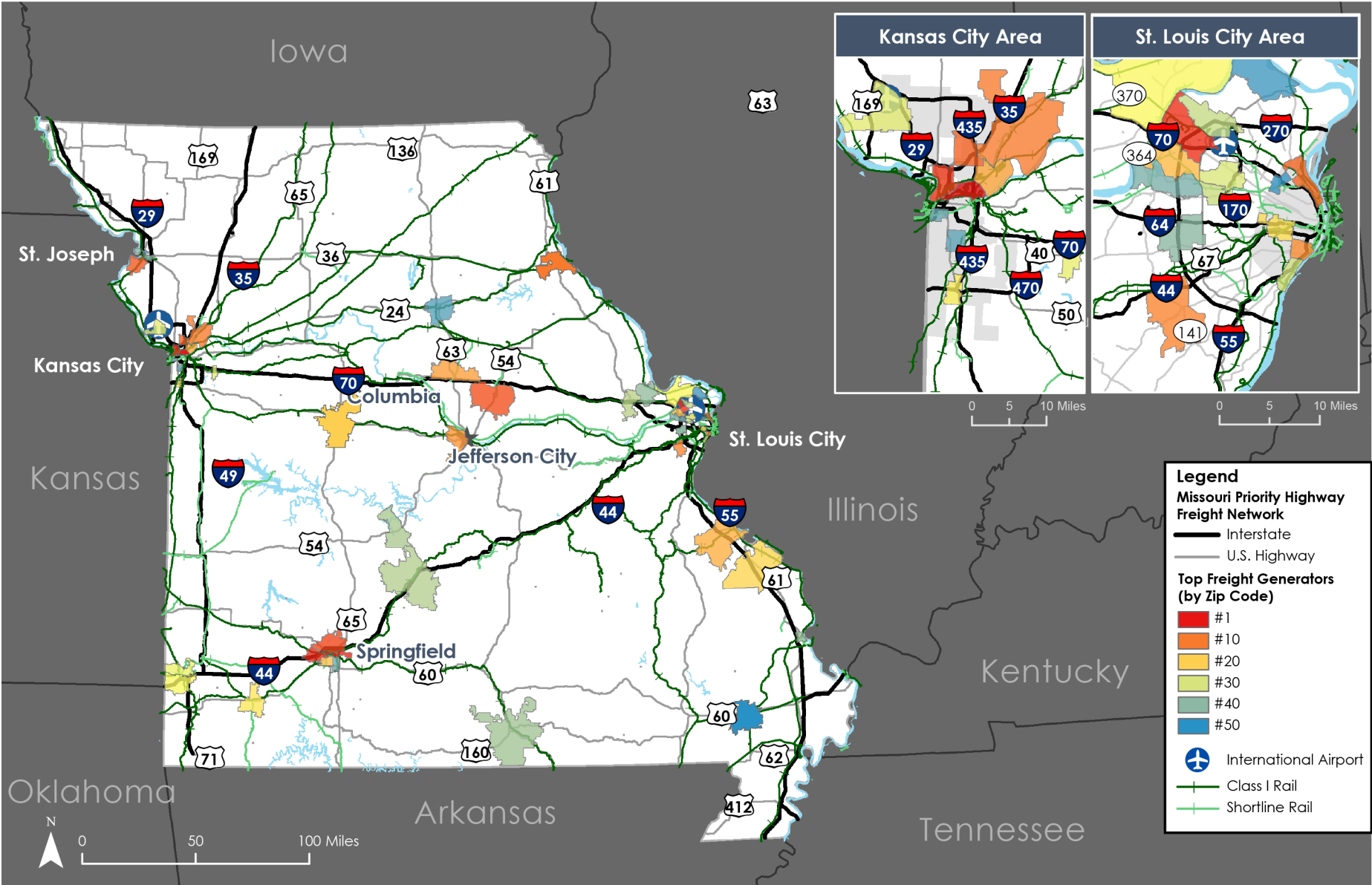
According to the 2017 USDA Census of Agriculture, Missouri is home to **95,320 farms** covering a total of 27.7 million acres, which employ more than 156,000 people. Missouri livestock and poultry farms sold more than **286 million broilers, 13 million hogs and pigs and 2 million cattle and calves**. Statewide, farms harvested nearly 13.5 million acres producing **563 million bushels of corn** for grain and **37 million bushels of winter wheat**. While mining activity employment in the state only totaled more than 3,600, the industry produces large volumes of raw materials. The state's manufacturing sector is particularly diverse, with many Missourians employed in transportation equipment manufacturing, food manufacturing, fabricated metals manufacturing and machinery manufacturing.

The majority of the top freight generators are located alongside major highways such as interstates. The metropolitan areas of Kansas City and St. Louis encompass the largest share of the top 50 ZIP codes with other urban areas such as Springfield, St. Joseph, Columbia and Joplin also showing high levels of freight generation. Top rural areas for freight generation in Missouri include Hannibal, Perryville, Ste. Genevieve, Sedalia and Monett (Figure 15).

Missouri's military and defense sector is also a significant freight generator, and is discussed in more detail in the **Economic Futures and Needs Assessment Report**. Notable military bases in Missouri include Fort Leonard Wood, Missouri National Guard, Whiteman Air Force Base and the National Geospatial Intelligence Agency.



FIGURE 15. TOP 50 MISSOURI FREIGHT GENERATORS





## Spotlight on Motor Vehicle Manufacturing

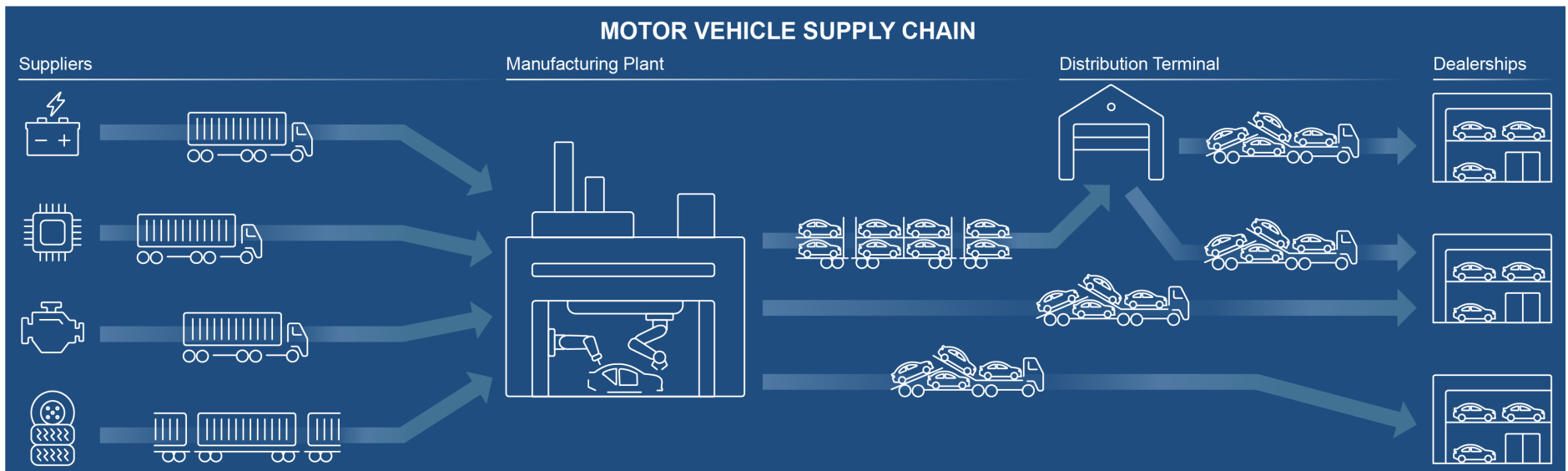
In 2018, more than **270** establishments employing more than **44,500** workers were located in Missouri, producing exports valued at more than **\$3.2 billion** in 2019.

Transportation equipment manufacturers represent the top manufacturing subsector in the state by employment comprising roughly 17% of all manufacturing employees. Missouri's transportation equipment manufacturing industry includes the production of vehicles across all

modes of transport, including the production of finished products such as motor vehicles, airplanes, locomotives and railcars, ships and boats, motorcycles and armored military vehicles as well as many of the parts and components that are combined to form the finished products. In addition to this established market, the shift to zero-emission vehicles provides Missouri automakers with an opportunity to capitalize on this boom to meet growing global demand.

Despite its track record of success, the industry has been substantially impacted by recent global macroeconomic trends. The impact of COVID-19 on the production of transportation equipment was severe as factories were shut down in the early days of the pandemic to slow the spread of the virus. As the pandemic has continued, it is clear that "just-in-time" manufacturing processes created serious vulnerabilities in global supply chains, which relied on efficient shipping and distribution networks. This led to demand for warehousing and distribution centers throughout Missouri as manufacturers seek to strengthen supply chains and can no longer rely on the just-in-time approach.

Poor road conditions can result in damaged products being delivered to the plant while congestion can cause unexpected delays at the plant. Maintaining a state of good repair and appropriate levels of service across the multimodal network is needed for this process to be successful.





## Spotlight on Warehousing, Distribution and E-Commerce

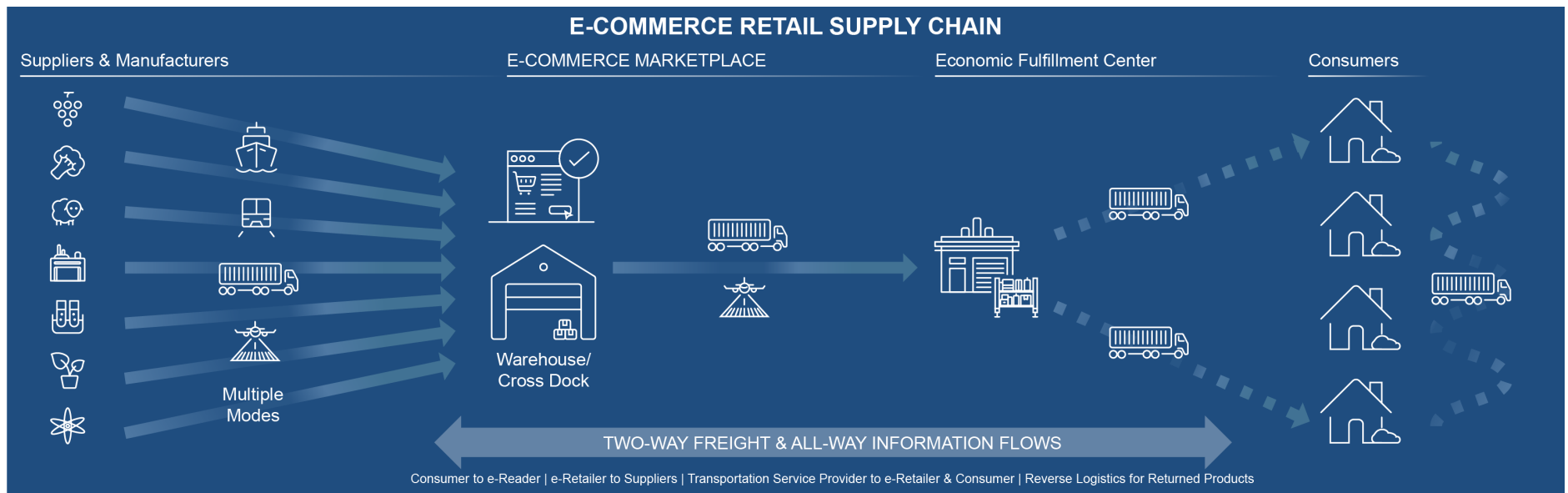
The retail sector has changed tremendously during the past few decades. E-commerce dramatically changed the traditional “brick and mortar” retail market as customers grew to rely on its convenience and cost-effectiveness. In 2020, the COVID-19 pandemic created an unprecedented and immediate jump in e-commerce demand, as consumers avoided in-person shopping to adhere to social distancing and work-from-home protocols. **E-commerce is now estimated to comprise 14.4% of total U.S. retail sales, an increase of 4.5% over its retail share in 2018, a total industry value of \$794 billion.**

E-commerce impacted many communities as traditional brick and mortar retail establishments close due to e-commerce competition, often being

replaced by warehouses and fulfillment centers located near consumers. Rising e-commerce volumes are resulting in “mega-warehouse” developments of one million square feet or more. Notably, Amazon has opened multiple warehousing and distribution facilities in Missouri, including an 855,000-square-foot facility in St. Peters and a 1.3 million-square-foot facility in Republic.

Being close to consumers allows e-retailers to deliver goods faster. Where constructing a new facility is not feasible, retailers are also experimenting with repurposing existing retail stores and developing micro fulfillment centers, which are new, smaller warehouses averaging about 10,000 square feet, close to or in major population centers. These freight-intensive facilities are critical to meeting Missourians’ demand for goods.

E-commerce depends on -a safe and efficient statewide roadway network.





SECTION

# 3

## The Future of Freight and Rail in Missouri



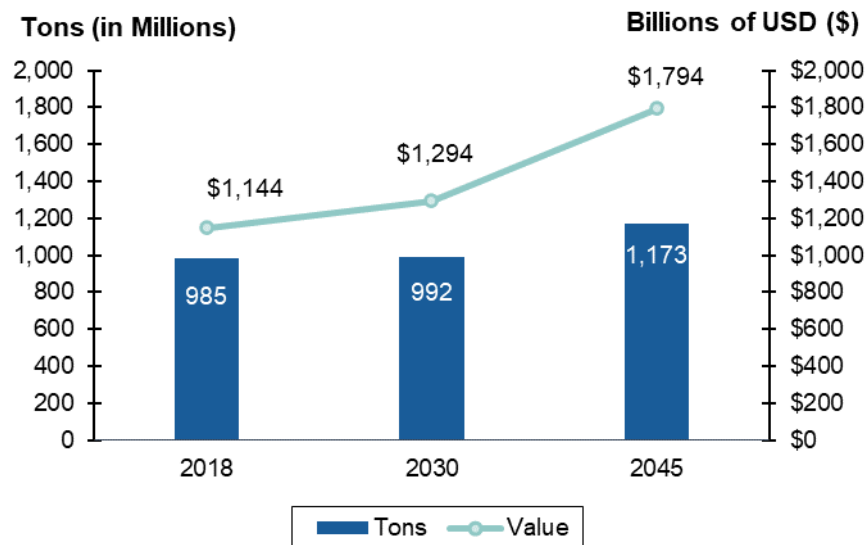
## Chapter 4: Future Freight Transportation Demand in Missouri

### Future Freight Flows

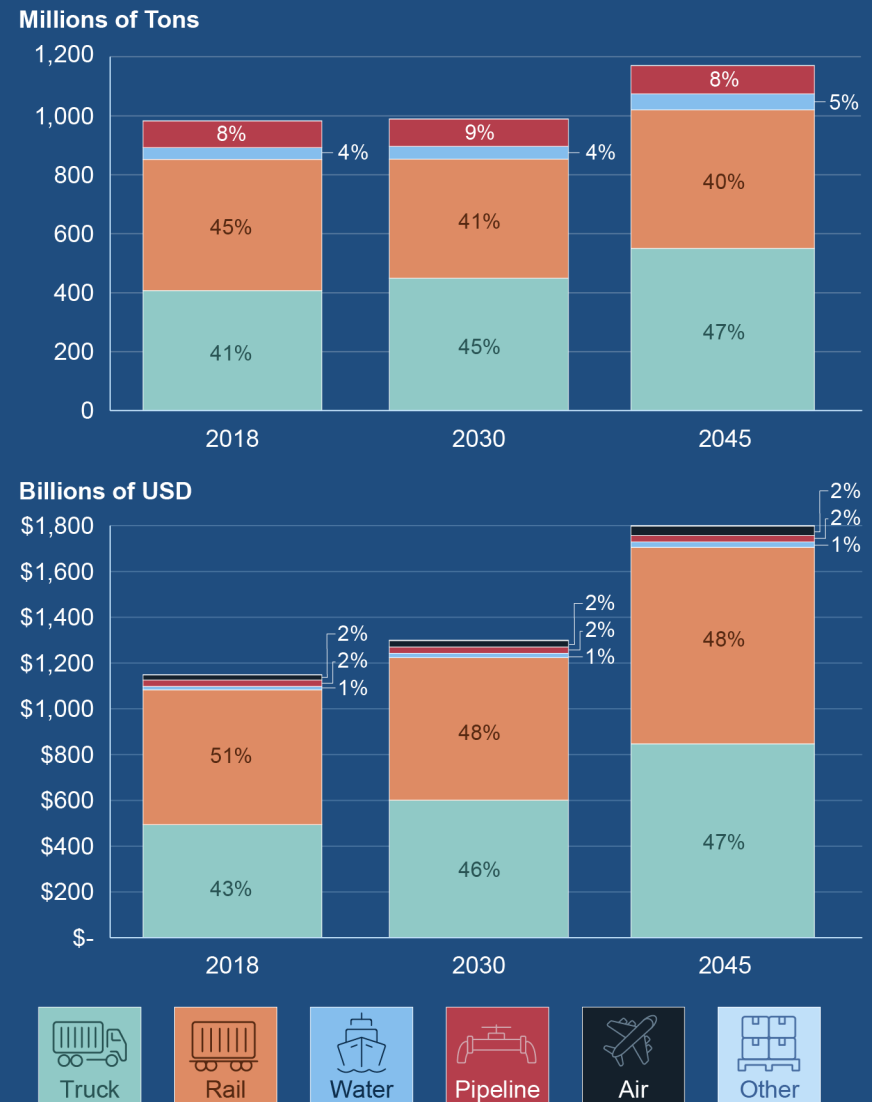
Every business and resident in Missouri depends on efficient and safe freight transportation. Freight demand is closely tied to the economy and a well-performing and connected freight transportation network is a critical factor for economic development.

In 2018, more than 985 million tons of freight valued at \$1.1 trillion moved on Missouri's freight transportation system. **By 2045, the state's transportation system is projected to carry more than 1.1 billion tons of freight, valued at \$1.8 trillion annually (Figure 16), an increase of 19% by tonnage and 57% by value.**

FIGURE 16. PROJECTED FREIGHT FLOWS, 2018-2045



### MISSOURI FREIGHT BY MODE, 2018-2045



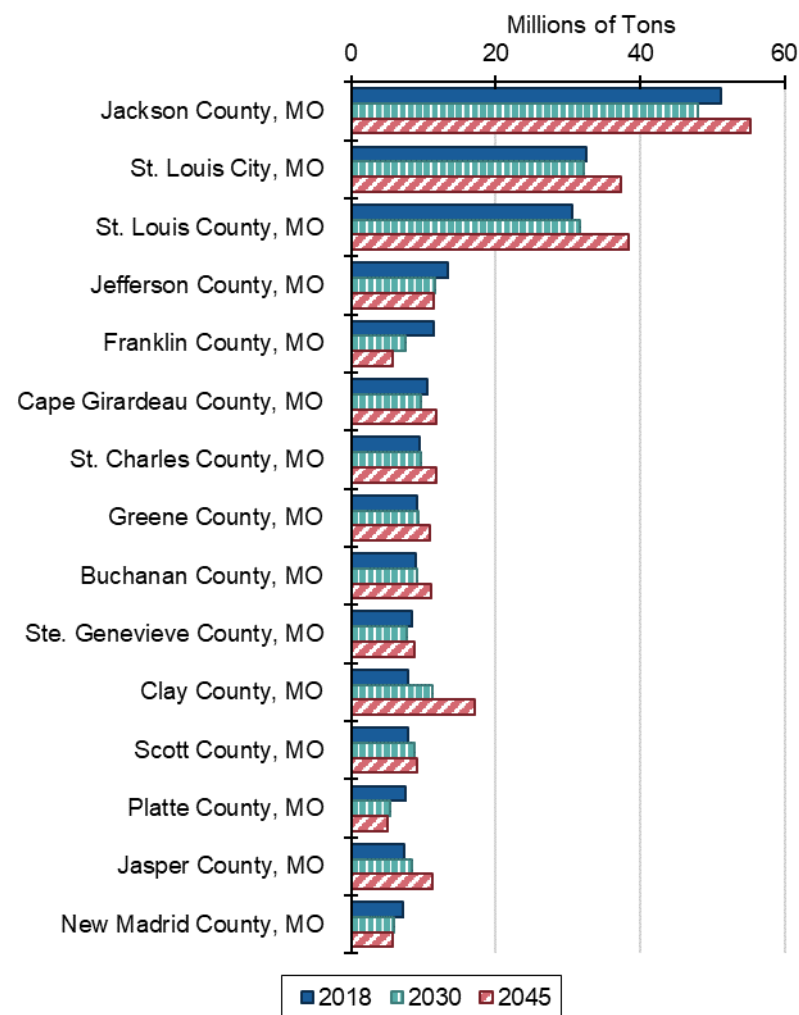


**2045 TOP 3** Commodities **BY TONNAGE** All Modes**2045 TOP 3** Commodities **BY VALUE** All Modes

These projected increases in freight volume and tonnage will be felt in both Missouri's urban and rural communities. Today, goods movement activity is heavily concentrated in the state's most populous areas, particularly in the Kansas City and St. Louis metropolitan areas, which comprise almost 50% of freight activity. Jackson County, home to Kansas City, saw the highest county-level share of freight movement, with more than 50 million tons of goods moving through the county in 2018, accounting for 15% of the state's total. Counties outside of the major metro areas with high levels of freight movement include Cape Girardeau, Greene (Springfield), Buchanan (St. Joseph) and Sainte Genevieve (Figure 17).

Freight movement in both the Kansas City and St. Louis metropolitan areas is expected to grow significantly by 2045, with tonnage exceeding 55 million tons and 37 million tons, respectively. Clay County (north of Kansas City) is expected to see freight traffic more than double in that time period, explaining the growth in the Kansas City metropolitan area.

**FIGURE 17. TOP FREIGHT GENERATING COUNTIES BY WEIGHT, 2018-2045**



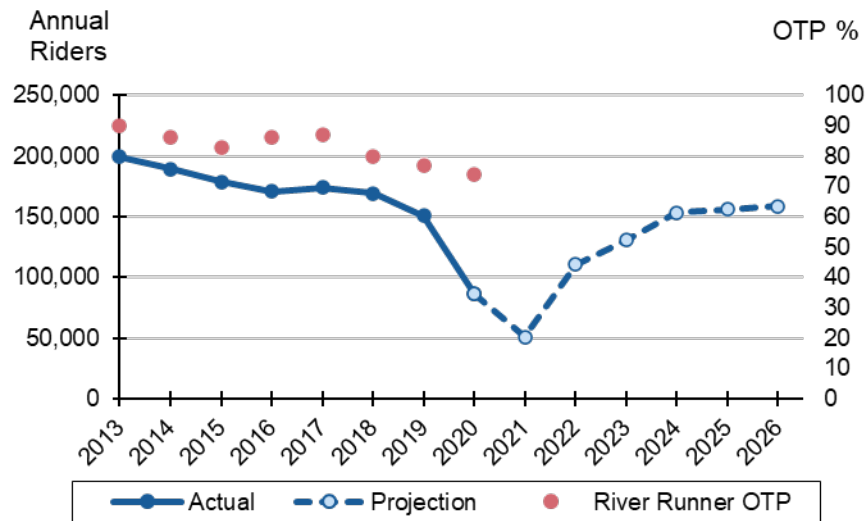
Note: Through (external-to-external) freight flows are excluded.

## Future of Passenger Rail

### Rebounding Demand

The *Missouri River Runner* saw decreasing ridership from 2013 (199,500 riders) to 2019 (152,700 riders), likely due to several factors including lower fuel prices, increased travel times, and a general downward trend of on-time performance on long-distance routes over this time. Then in 2020, ridership sharply declined as service was temporarily reduced from two round trips per day to one because of the COVID-19 pandemic. Amtrak projections predict further loss in ridership in 2021 before it rebounds to 158,700 riders by 2026, within 20% of the 13-year high set in 2013.

**FIGURE 18. MISSOURI RIVER RUNNER RIDERSHIP PROJECTIONS, 2013-2026**



<sup>1</sup> U.S. Energy Information Administration, Short-Term Energy Outlook (STEO), 2021

Economic changes can also have a major impact on passenger rail demand and growth. Income, fuel cost and employment can impact the demand for passenger rail as travelers make their mode choices:

- **Fuel costs:** Historically, lower fuel costs are correlated with people driving more frequently and could reduce passenger rail ridership. Fuel economy is expected to improve, reducing the amount of fuel needed to travel as well as depressing demand, which may negatively impact passenger rail ridership. In the near-term, fuel prices are expected to normalize coming out of the COVID-19 pandemic but remain below 2019 levels through 2022.<sup>1</sup>
- **Economic Activity:** Ridership can be driven by the strength of the overall state, regional and national economy as well as factors such as income, employment status and growth industries. Certain segments of the economy can also drive ridership, particularly those which require intercity business travel which could rely on Amtrak service.



Aspects of passenger rail operations also have a considerable impact on demand for service:

### Service Frequency



The number of trains on a given line has a strong bearing on whether the service is used or not. **Additional service frequency** offer the traveler more flexibility in choosing a travel time which helps passenger rail compete with other modes.

**Travel time** is a major consideration for travelers, and faster service compared to other modes improves the likelihood of passenger rail being selected. Conflicts between freight and passenger trains can cause delays, which can have a negative effect on ridership.

### Travel Time



### Service Amenities



Traveler satisfaction with **station and train car amenities** could encourage more frequent use and increase demand.

Recently procured locomotives purchased produce **90% fewer emissions and a 16% reduction in fuel use**, leading some riders to opt for passenger rail due to its environmental benefits.

### Environmental Considerations



## Service Opportunities

There are several opportunities to grow and improve passenger rail service in Missouri. It is critical for the state to take advantage of these opportunities to ensure sustained ridership growth after a series of back-to-back challenges for the *Missouri River Runner* service, beginning with suspended service following prolonged flooding in 2019 through the onset of the COVID-19 global pandemic in March 2020.

Some proposed passenger rail improvements would alleviate conflicts between passenger and freight trains. Other passenger rail improvements focus on more targeted needs such as expanding passenger rail service and improving rail stations. This plan's proposed passenger rail improvements can be separated into categories of enhanced capacity, new or improved services and station improvements:

- **Enhancing Capacity.** Discrete improvements to Missouri's physical rail infrastructure will improve track capacity within the system. This includes creating crossover and siding tracks and additional main lines to complement existing infrastructure to improve the network's resiliency and efficiency. These proposed improvements would improve the on-time performance of passenger rail service and would also allow for added frequencies of existing services and help facilitate new services in the future.
- **New or Improved Services.** There are potential opportunities for new services, extensions to existing ones or increased frequencies. For example, future analysis may support extension of the *Missouri River Runner* service within and beyond Missouri. Creating or extending service would expand the reach of passenger rail in Missouri, providing access to urban population centers and to smaller cities and towns. Service to new cities would create access to the national intercity rail



network for Missouri communities, providing residents improved transportation choice, thus spurring tourism.

- **Station Improvements.** Improving passenger rail stations would ensure continued passenger rail service and guarantee the safety and functionality for years to come. Station upgrades are proposed for the

historic station facilities at Kirkwood, Independence and Poplar Bluff, which will help them remain structurally sound and adapt to modern passenger rail needs. Jefferson City does not currently have an operational station building. Travelers board and alight in Jefferson City using temporary outdoor facilities since its station closed in 2019 due to structural concerns.





## Chapter 5: Freight Trends and Scenarios

### Macroeconomic and Industry Trends

Freight investment decision-making in Missouri should not only support the needs of state's businesses and industries today, but also well into the future. While the 2022 SFRP details current and projected freight flows through 2045, forecasts are derived from socioeconomic, macroeconomic and societal trends and assumptions based on our current understanding of the future of freight. However—as we know from unforeseen current events, such as the COVID-19 global pandemic—there are infinite possibilities for the future that may be influenced by changes in technology, geopolitics and other innovations, among many other influences. There are several notable innovations in transportation, science, technology and data collection and management that are already impacting industries across the globe, and especially in Missouri.



#### Biotechnology



Missouri's health care and biotechnology sector is already robust, as the state is home to major health services companies such as Express Scripts, in addition to world-renowned research hospitals and centers. This industry has specific freight and logistics needs to manufacture, handle and transport highly perishable and time-sensitive goods.

Missouri is one of the leading agriculture states in the U.S., with 95,000 farms covering two-thirds of the state's land acreage and contributing \$88 billion to the statewide economy. The state is also a leader in agriculture technology, including innovations in crop science, biofuels and precision agriculture, among others. There are dozens of Missouri-based companies in this field, including DuPont, Bayer Crop Science USA and Bunge.

#### Agriculture and "Agtech"



#### Advanced Manufacturing



Missouri's primary advanced manufacturing sectors are aerospace and motor vehicles and parts. Boeing's Defense, Space, and Security facility in Missouri produces fighter jets, unmanned MQ-25 refueling drones and other military equipment. In 2020 alone, Missouri produced nearly 600,000 vehicles at the Ford and GM plants, advanced military jets for the U.S. and allied militaries.

Missouri businesses are leading the development and production of batteries for defense, space, automotive and consumer industries. Missouri also leads the production of lead for batteries and development of lithium batteries. These technologies support many renewable energy markets and sectors, including solar generation, wind production and battery electric vehicle production.

#### Energy Solutions



In addition to the industry trends driving changes in freight demand on the production side, population growth in Missouri will also impact consumer demand for goods. **Between 2010 and 2020, the state's population grew from nearly 6 million people to over 6.1 million people, an increase of nearly 166,000 people or 3% total growth.** MoDOT's Long Range Transportation Plan projects Missouri will continue to grow over the next 20 years, with a total population approaching 6.4 million people in 2040.

Missouri's net population increase will be primarily attributable to natural increase, with slight gains in net migration. Other socioeconomic factors inform domestic consumer and freight demand include aging population, concentration of population and educational attainment (right).

These factors point to the necessity of a resilient transportation network that can accommodate the mobility and consumer demands of residents aging in place, homeowners who are improving, selling or buying in Missouri, as well as education attainment that can contribute to a workforce that supports growth and innovation.

Changing demographics impact not only where Missouri's businesses choose to locate, but also where their products are transported and how much is consumed. It is estimated that total freight flows in Missouri will increase from 985.3 million tons to over 1.1 billion tons by 2040. **During that same time, state population is projected to grow from 6.1 million to 6.4 million people, meaning that annual freight tonnage per capita is expected to increase from 160.9 tons to 173.3 tons.** Freight transportation investments across both Missouri's primary and local networks are necessary to support growth in consumer demand and industry production.

### Aging Population



**17.3% of the population is over 65 years old, compared to the national average of 16.5%.** Missouri's Office of Administration, Division of Budget and Planning projects ten counties will have greater than 30% of their population over 65 by 2030.

**Missouri, as with most states, will continue to see a migration of people moving from rural to urban areas.** Over the next 30 years, growth is expected in the suburban counties surrounding Kansas City, St. Louis and Springfield, with significant declines continuing in the rural areas, most notably north of U.S. Route 36 and in the south-central area of the state.

### Concentration of Population



### Educational Attainment



**Educational attainment levels show 29% of the population with a college degree or higher, slightly lower than the national share of 32.1%.** This contributes to lower household income and higher rates of poverty for Missourians. Colleges and technical schools can improve job opportunities and increase household purchasing power.

## Scenarios

As evidenced by the significant changes that occurred because of the COVID-19 pandemic, it can be difficult to predict how disruptor events and changes to trends will impact freight demand and freight flows. It is impossible to know what the future holds and how world events will change the economic forces behind freight movements and commodity flows on Missouri's freight network.

Trends that have a high potential to impact macroeconomic conditions and freight flows across multiple industries are referred to as “disrupters.” This scenario planning exercise manipulates future commodity flow forecasts using a set of assumptions and currently known information to analyze where disruptor impacts may arise. This section summarizes the commodity flow impacts of two potential trends and disrupters that may have a particularly strong impact in Missouri:

- **Scenario A: Renewable Energy**—This trend accelerates a shift in energy commodities away from fossil fuels such as coal, crude oil and petroleum products and towards renewable energy products, leading to an increase in metallic ore commodities such as cobalt, lithium and nickel ores.
- **Scenario B: Near-Shoring**—This trend accelerates a shift in the design of trade policies and supply chains that encourage certain manufacturing and apparel commodities to be produced more in the Americas and imported less from places like Asia.



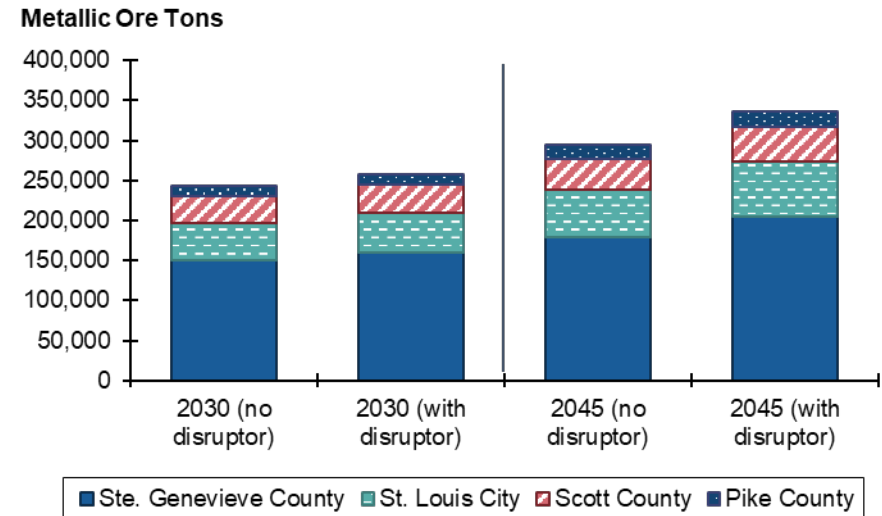
## Renewable Energy

Market shifts from fossil fuels to renewable energy sources and fuel types, such as battery electric vehicles, will impact Missouri's industries, freight flows and supporting infrastructure. As domestic and global markets shift to renewable energy, opportunities and challenges to the state's economy will arise, particularly in the automotive industry. Many of these businesses have already begun to pivot to production of electric vehicles for consumers, and Missouri has made great strides in developing electric vehicle infrastructure. However, for Missouri's automotive industry to fully capitalize on this boom, the state must support resilient supply chains capable of handling the new inputs and components required to produce these vehicle types. Missouri's freight transportation network must also be capable of handling the increased inbound and outbound freight flows, as well as changing demand amid a sharp increase in industrial land use for battery manufacture and disposal, as well as mining and processing of lithium, nickel and cobalt.

**By 2045, Missouri freight flows under this scenario are expected to:**

- ↓ **REDUCE** the projected volume of coal and other fossil fuels and increase the projected volume of metallic ores transported on Missouri's freight network.
- ↑ **INCREASE** projected volume of metallic ore shipments originating in St. Genevieve County by nearly 26,000 tons (Figure 19), which is equivalent to an additional 650 fully-loaded trucks.
- ↓ Result in a **6% DECREASE** from baseline tonnage projections for St. Louis.
- ↓ Lead to **2.2% DECREASE** in the total tons (1.1B tons vs. 1.2B tons) and a 0.4% decrease in total value (\$1.9B vs. \$1.8B) moved on Missouri's freight network.

**FIGURE 19. IMPACT OF A SHIFT TO RENEWABLES ON METALLIC ORE ORIGINATING FLOWS (TONS)**



Key considerations for adapting to renewable energy shifts in Missouri:

Establishing a robust network of alternative fueling infrastructure.

Securing alternative state revenue streams due to declining motor fuel tax collection.

Achieving strong supply chains for metal and parts for zero-emission automobile and parts manufacturers.

The primary opportunities in renewable energy markets for Missouri are:

Public-private partnerships among automobile manufacturers and states.

Shifting supply chains and expanded industry opportunities, including expansion of mining activities.

Strong potential for manufacturing sector job growth.



## Near-Shoring

In recent decades, U.S. trade policy has supported globalization, allowing businesses to buy and sell products more easily across the world. Supply chains for even the most basic essential items have become deeply complicated. However, the COVID-19 pandemic exposed major weaknesses in the supply chains for most manufactured items, resulting in prolonged shortages of essential, needed items such as personal protective equipment. A global supply chain model prioritizes cost reduction, just-in-time production and forecasting methods that do not consider major disruptions such as a global pandemic or other natural disasters.

Reimagining supply chains that leverage local industries and transportation linkages (also known as “near-shoring”) could not only remediate the weaknesses exposed during the pandemic but also increase jobs in manufacturing sectors, providing economic development opportunities. Increased investment in domestic sourcing and/or localized manufacturing may create exponential demand from Missouri industries.

**By 2045, Missouri freight flows under this scenario are expected to:**



**REDUCE** the volume of through-state flows, and increase the volume of outbound, inbound and intrastate flows.

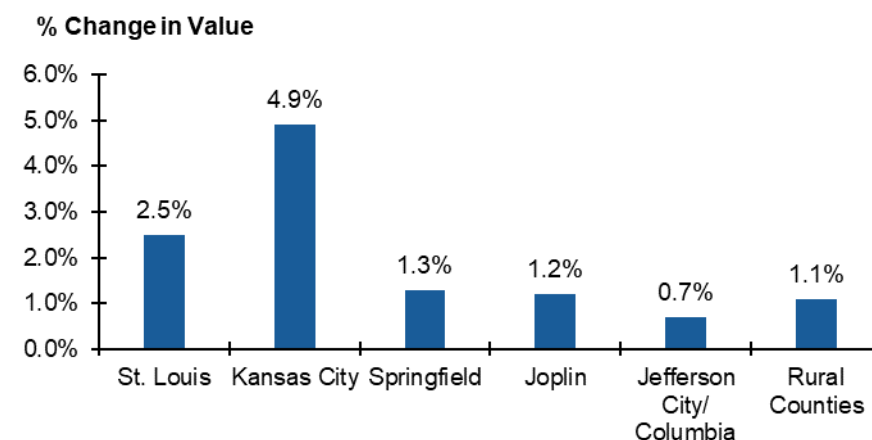


**INCREASE** the value and volume of freight flows in Missouri’s urban areas, including Kansas City and St. Louis (Figure 20).



**INCREASE** carload rail, intermodal rail and air cargo volumes, and slightly reduce growth projections for truck volumes.

**FIGURE 20. IMPACT OF NEAR-SHORING GOODS ON MISSOURI URBAN AREAS BY 2045 (% CHANGE IN VALUE)**



Key considerations for adapting to increased domestic manufacturing and near-shoring policies in Missouri:

Intermodal connectors to support increased inbound/ outbound flows vs. through flows.

Continued need for modern facilities.

Workforce training and development.

Missouri’s primary opportunities for adapting to increased domestic manufacturing and near-shoring policies:

Increased investment in domestic sourcing.

Advancing manufacturing sector growth.

New and repurposed industrial, warehousing and distribution space throughout the state.



SECTION

# 4

## Delivering Missouri's Multimodal Freight and Passenger Rail Vision



## Chapter 6: Addressing Missouri's Multimodal Freight & Passenger Rail Transportation Needs, Challenges and Opportunities

The 2022 SFRP identifies a number of challenges and needs across the state's multimodal freight and passenger rail transportation network, including aging infrastructure, congestion and bottlenecks, safety concerns, system capacity constraints, rural and multimodal connectivity challenges and funding challenges. Meeting these challenges requires the strategies, implementable actions and recommendations presented in the 2022 SFRP to be multimodal, multifaceted and comprehensive. The recommended overall strategy outlines statewide multimodal freight and passenger rail enhancements that will:

- Strengthen the multimodal freight and passenger rail industry in Missouri by promoting a multimodal approach to mobility, reliability, efficiency and safety; and
- Support long-term population and demographics changes, freight and economic growth, economic competitiveness and quality of life in Missouri.

This Chapter describes four strategies designed to change the course of multimodal freight and passenger rail in Missouri based on current and projected opportunities (shown right). To support these strategies, the SFRP also includes implementable actions under the context of four multimodal and broad-based categories designed for addressing multimodal freight and passenger rail transportation challenges in Missouri:

- **Operations & Technology.** Specific planning, engineering and public works improvements to support improved multimodal freight and passenger rail mobility and safety.
- **Programs.** A collection of programs and initiatives that can be undertaken to achieve policy goals.
- **Policy, Outreach & Coordination.** Broad policy recommendations to help change the way Missouri approaches multimodal freight and passenger rail planning, including expanding communication and interaction with critical stakeholders.
- **Projects.** Specific infrastructure projects that support policy goals and improve multimodal freight and passenger rail movement throughout Missouri.



### Expand the “Ag Coast of America”

Support increased shipments of agricultural products on Mississippi & Missouri Rivers.



### Missouri Manufactures

Support Missouri's existing and evolving manufacturing sectors, including motor vehicles, chemicals and e-commerce, warehousing and distribution.



### Efficient and Intelligent Multimodal Freight Corridors

Leverage technology solutions and operational changes to improve efficiency and safety of freight movement across all modes.



### Expand Freight and Passenger Rail Market Opportunities

Expand rail freight market to make Missouri more competitive for shippers, and improve and expand passenger rail service and access to improve passenger mobility options.



Expand the Ag Coast of America

The “Ag Coast of America” is a region that covers a 15-mile stretch of the Mississippi River that features some of the highest levels of capacity anywhere along this crucial waterway. The purpose of this strategy is to expand the Ag Coast of America to support increased shipments of agriculture products – including grain, fertilizer and processed food products – on Mississippi and Missouri rivers, continuing the success of the Ag Coast of America and providing additional opportunities for agribusinesses to leverage Missouri’s efficient and robust inland waterways network. This strategy will not only lead to increased job and business opportunities, but it will also benefit other industries by lowering freight costs across the state and providing additional capacity and access to marine shipping modes.

Table 1 presents the implementable actions for the Expand the Ag Coast of America strategy by category and identifies where each action supports one of MoDOT’s three pillars: safety, service and stability.



TABLE 1. EXPAND THE “AG COAST OF AMERICA” IMPLEMENTABLE ACTIONS

Operations & Technology		Program		Policy, Outreach & Coordination	
	Improve efficient road and rail access to inland port site		Support public-private partnership opportunities that expand port capacity and connectivity		Convene a biennial freight and agribusiness transportation summit
			Continuation of the Freight Steering Committee with public and private sector stakeholders		Promote importance of Missouri ports and waterways and the maritime industry to the state and national economies
			Support increased bulk and container cargo capacity and handling capabilities		Strengthen partnerships between MoDOT, state and local agencies, and industry to identify site selection opportunities for shippers
			Develop a coordinated and unified approach for state and federal funding for port-related projects		Strengthen partnership between MoDOT, ports, and the U.S. Army Corps of Engineers for improved inland waterways maintenance
			Continue support for COV/COB ventures led by private sector partners		

Icon guide: Safety Service Stability

Note: Actions may apply to more than one strategy but are only shown with the most closely-aligned strategy.












## Missouri Manufactures

Missouri has a long history of supporting some of the nation's most important manufacturing sectors, including motor vehicles, chemicals and e-commerce, warehousing and distribution. While the foothold of these industries remains strong in Missouri, certain macroeconomic and global trends – such as the near-shoring of manufacturing and the global impact of the COVID-19 pandemic – may lead to changes in sourcing, shipping and employment for Missouri's freight-intensive companies in some impacted industries. Shifting to increased domestic sourcing may result in increased inbound and outbound freight movements, advanced manufacturing employment, and demand for industrial space. While MoDOT does not have control over these macroeconomic trends, it is in a

unique position to expand access and connectivity for potential new and existing businesses, educate the public and improve partnerships and coordination between private and public sector organizations throughout the state. The purpose of the "Missouri Manufactures" strategy is to enable the state to support the evolving freight transportation needs for goods movement and its supporting workforce.

Table 2 presents the implementable actions for the "Missouri Manufactures" strategy by category and identifies where each action supports one of MoDOT's three pillars: safety, service and stability.

**TABLE 2. MISSOURI MANUFACTURES IMPLEMENTABLE ACTIONS**

	Operations & Technology		Program		Policy, Outreach & Coordination
	Improved road and rail access to air cargo facilities		Develop a freight transportation public education and awareness program and share the road campaign		Strengthen partnerships between MoDOT, state and local agencies, and industry to identify and invest in the transportation system to support the manufacturing sector
	Improved road and rail access to new and repurposed industrial sites		Identify and invest in potential infrastructure needed to support new and emerging industries expected in new areas of the state		Convene a biennial freight and manufacturing transportation summit
			Develop a freight transportation planning training program for local and regional planners		Enhance coordination with MPOs and local governments to identify freight infrastructure needs of statewide importance
			Expand opportunities, regulations, and policies for intraregional mass transit or van-pool program for major freight employment sites		Develop land use guidelines for mitigating freight and industry conflicts with residential and commercial land uses
					Promote capacity availability and development opportunities at Missouri's air cargo-handling airports.

Icon guide:  Safety  Service  Stability

Note: Actions may apply to more than one strategy but are only shown with the most closely-aligned strategy.

















## Efficient and Intelligent Multimodal Freight Corridors

There are various levels of transportation technology – from dynamic signage to connected and autonomous vehicles – that have the potential to improve mobility and safety across the multimodal network. Some of these technologies are used by shippers while others can be implemented by state and local public works agencies. In addition to technology solutions, other operational, program and policy actions can result in mobility and safety outcomes through improved coordination, communication and education.

The goal of this strategy is to leverage technology solutions and operational changes to improve the efficiency of freight movement across all modes.

Table 3 presents the implementable actions for the “Efficient and Intelligent Multimodal Freight Corridors” strategy by category and identifies where each action supports one of MoDOT’s three pillars: safety, service and stability.

**TABLE 3. EFFICIENT AND INTELLIGENT MULTIMODAL FREIGHT CORRIDORS IMPLEMENTABLE ACTIONS**

Operations & Technology		Program		Policy, Outreach & Coordination	
	Increase wayfinding via road marking, signage and lighting on the highway freight network		Develop wayfinding and signage guidelines for urban and rural areas to include private roads and major freight generators		Collaborate with regional stakeholders to encourage truck parking at non-MoDOT public facilities and private commercial and industrial sites
	Increase signage and ITS on freight routes for locations of truck parking, safety hot spots, queuing and blocked rail crossings		Implement freight-centric design guidelines for safety, bridges, interchanges, truck parking and construction		Promote and incentivize off-peak operations in congested areas
	Deploy advanced warning systems (e.g., over-height, over-weight, over-speed, hazards, detours/rerouting)		Expand freight data collection program to include vehicle classification counts, truck parking capacity/utilization and safety hotspots		Develop truck traffic impact analysis guidelines to include truck parking/queuing impact and inspection locations in urban and rural areas
	Deploy truck parking availability system along highway network		Support implementation of freight-based technology solutions and foster emerging transportation technologies across all modes		Develop policy and programs to support statewide deployment of electric charging infrastructure for trucks
	Invest in a statewide travel demand model and supporting staff		Integrate multimodal freight into regional planning programs		Promote capacity building for regional and state freight transportation planning staff.
			Develop regional multimodal thoroughfare planning program		

Icon guide:  Safety  Service  Stability

Note: Actions may apply to more than one strategy but are only shown with the most closely-aligned strategy.













## Expand Freight and Passenger Rail Market Opportunities

Missouri is in a position to significantly grow rail freight in the state by capitalizing on recent developments within the state as well as global shifts in trade patterns. Through implementable actions, Missouri can expand its rail freight market, making the state more competitive for shippers and easing the pressures on the highway system. Missouri's passenger rail network has also struggled with funding shortfalls, limited support for unserved and underserved communities, station and track infrastructure maintenance and issues related to service, operations and coordination.

The purpose of this strategy is to expand the rail freight market to make Missouri more competitive for shippers and to improve and expand passenger rail service and access to improve passenger mobility options

Table 4 presents the implementable actions for the “Expand Freight and Passenger Rail Market Opportunities” strategy by category and identifies where each action supports one of MoDOT's three pillars: safety, service and stability.

**TABLE 4. EXPAND FREIGHT AND PASSENGER RAIL MARKET OPPORTUNITIES IMPLEMENTABLE ACTIONS**

Operations & Technology		Program		Policy, Outreach & Coordination	
	Reduce number of at-grade highway/rail crossings to improve the efficient movement of freight and increase the quality of life through reduce congestion and improved safety		Continue work with private-sector rail industry to expand rail capacity, improve rail fluidity and ease traffic congestion to accommodate projected growth		Coordinate with local economic development agencies and short line railroads to craft solutions to avoid removal or reduction of short line rail operations
	Invest in grade separations for high-use/risk at-grade crossings to improve safety		Increase truck to rail freight conversions by working with shippers and carriers to improve access to rail freight		Support funding for spurs serving local businesses
	Improve access and connectivity to multimodal freight rail and passenger rail facilities.		Support expansion of new intercity passenger rail service where feasible.		Support increased track capacity for rail corridors at or near capacity
			Expand opportunities, regulations and policies for intraregional mass transit and passenger rail to connect to major freight employment sites		Evaluate feasibility of reengagement of underused rail assets to improve freight and passenger transportation in rural areas.
			Establish a sustainable funding source to support continuation of <i>Missouri River Runner</i> service		Strengthen partnerships between MoDOT and railroad industry stakeholders to access Federal and state funding support

Icon guide:  Safety  Service  Stability

Note: Actions may apply to more than one strategy but are only shown with the most closely-aligned strategy.



## Chapter 7: Multimodal Freight & Passenger Rail Investment Implementation Plan

### Fiscally-Constrained Freight Investment Plan

The federal FAST Act established the National Highway Freight Program funds which are available for obligation for up to four years. NHFP obligations are reimbursed from the Highway Account of the Highway Trust Fund – they come with contract authority and are subject to the annual obligation limitation imposed on the Federal-aid Highway Program. The federal share for NHFP funds is generally 80% but certain types of improvements (predominately safety improvements) may have a federal share of up to 100%.

#### MISSOURI FREIGHT INVESTMENT PLAN

The state's freight investment plan consists of **594** fully-funded projects that address multimodal freight needs, costing a total of **\$2.5 billion**.

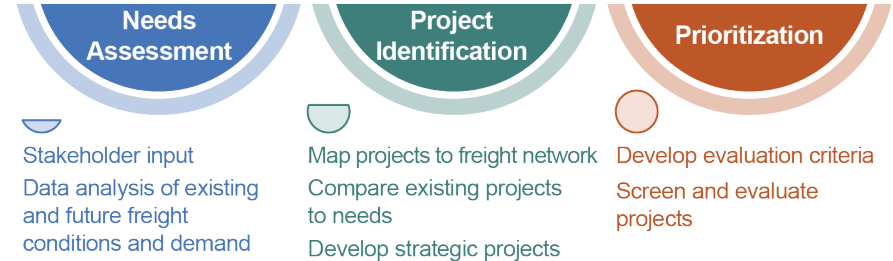
Projects must be identified in the Statewide Transportation Improvement Program and be consistent with Long-Range Transportation Plans. With the passage of the Bipartisan Infrastructure Law in November 2021, state freight plans must now provide an eight-year fiscally constrained Freight Investment Plan that describes how the funds would be invested. Eligible projects, which must contribute to the efficient movement of freight on the National Highway Freight Network, include elements such as planning, construction, intelligent transportation systems and bridges.

The fiscally constrained FIP includes the proposed use of NHFP funds distributed to Missouri. These projects are included in the STIP as approved by MHTC. This list will be updated annually, at a minimum, as

new projects are selected for inclusion in the STIP and approved by MHTC. It should be noted that MoDOT does not fully program years 3, 4 and 5 of the STIP to retain flexibility to address emerging needs. Missouri's apportionment of the NHFP funds for the period spanning 2022-2026 is \$176.2 million.

The FIP includes projects on the Missouri Multimodal Freight System. All freight projects were selected from the pool of projects identified for funding in the 2022-2026 STIP. MoDOT's STIP includes both highway and multimodal projects, which is reflected in this FIP. The process for developing the FIP is summarized in Figure 21.

FIGURE 21. MODOT FREIGHT INVESTMENT PLAN PROCESS



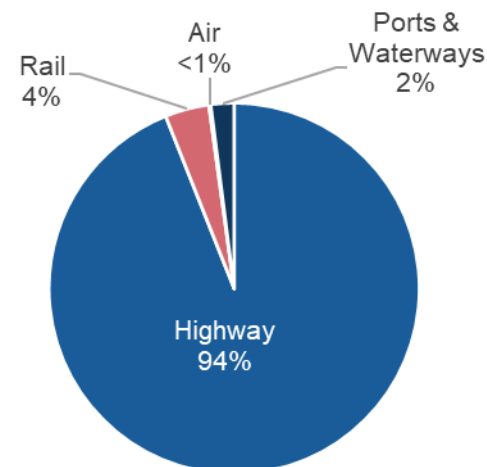
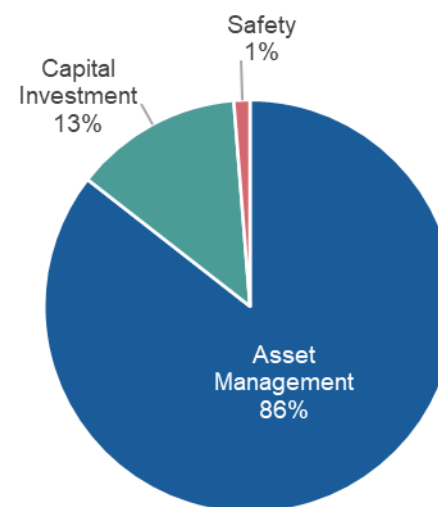
The project prioritization process was a data-driven, stakeholder informed process. It both involved stakeholders from across the State and leveraged the Missouri Freight Analysis System (known as MoFAS) tool, which used a multivariate scoring process to rank projects according to MoDOT's priorities.

**TABLE 5. MULTIMODAL FREIGHT INVESTMENT PLAN  
SUMMARY BY YEAR, (IN THOUSANDS OF DOLLARS)**

State Fiscal Year	Total Cost	Committed NHFP Funds	Other Federal Funds	State & Local Funds
2022	\$932,823	\$85,074	\$829,205	\$24,233
2023	\$635,920	\$17,632	\$604,225	\$29,777
2024	\$658,709	\$41,272	\$589,769	\$17,774
2025	\$117,120	\$18,635	\$85,297	\$15,504
2026	\$140,204	\$13,550	\$125,997	\$1,596
2027	\$0	\$0	\$0	\$0
2028	\$0	\$0	\$0	\$0
2029	\$0	\$0	\$0	\$0

Table 5 summarizes the 2022-2026 Missouri Freight Investment Plan by year for highway, rail, air cargo and ports and waterways freight modes. MoDOT does not commit all NHFP funds to retain flexibility to address emerging freight needs. A list of projects included in the FIP is provided in Appendix A, which is updated annually in conjunction with the STIP as freight needs continue to evolve on an annual basis. The majority (94%) of this funding is allocated towards highway projects, while rail projects comprise 4%, ports and waterways projects comprise 2% and air projects comprise less than 1% (Figure 22).

The multimodal projects in the FIP meet needs across a variety of the SFRP goal areas including safety, mobility and connectivity and asset preservation; notably, 86% of programmed funds for highway projects is dedicated towards asset management needs (Figure 23). It should be noted that while projects are typically programmed to meet a primary need, the benefits often address other needs and goals.

**FIGURE 22. MULTIMODAL FREIGHT INVESTMENT PLAN  
SPENDING BY MODE****FIGURE 23. HIGHWAY PROJECT FUNDING BY CATEGORY**

## Unmet Freight Needs

Beyond the projects identified in the FIP, the 2022 SFRP identifies projects, needs and areas of Missouri's multimodal freight network that do not currently have full funding in place. The identified unmet freight needs capture longer range investment in Missouri's multimodal freight network, including private sector rail and port projects identified by MoDOT's partners and projects proposed by stakeholders that are not yet in any MoDOT plans. The complete list of unmet freight projects by mode is available in **Appendix A**.

Securing the funding to maintain the freight network, address safety concerns, improve connectivity and mobility of the freight system and support economic growth and competitiveness for Missouri requires financial resources well beyond those currently available. Additional federal resources, increased state investment and other financing strategies will be needed to close the gap between the freight infrastructure and facility needs and the supply of funds.

The shortage of funds is a critical problem. MoDOT should review the list of priority projects with its partner organizations, agencies and freight stakeholders to identify funding for these projects. Initial funding for planning and preliminary engineering should be identified so that strategic projects can be positioned and ready for development if funding is identified. The lack of funding available today represents the most significant obstacle to the implementation of the SFRP.

### SUMMARY OF UNMET FREIGHT NEEDS IN MISSOURI

#### HIGHWAYS

**739** unique segments covering nearly **1,400 miles**, with 10% classified as high need. **Figure 24** shows which of Missouri's high-need highway segments do and do not have a STIP project programmed.

#### FREIGHT RAIL

**29** identified projects with an estimated construction cost of between **\$548M** and **\$582M**.

#### PORTS & WATERWAYS

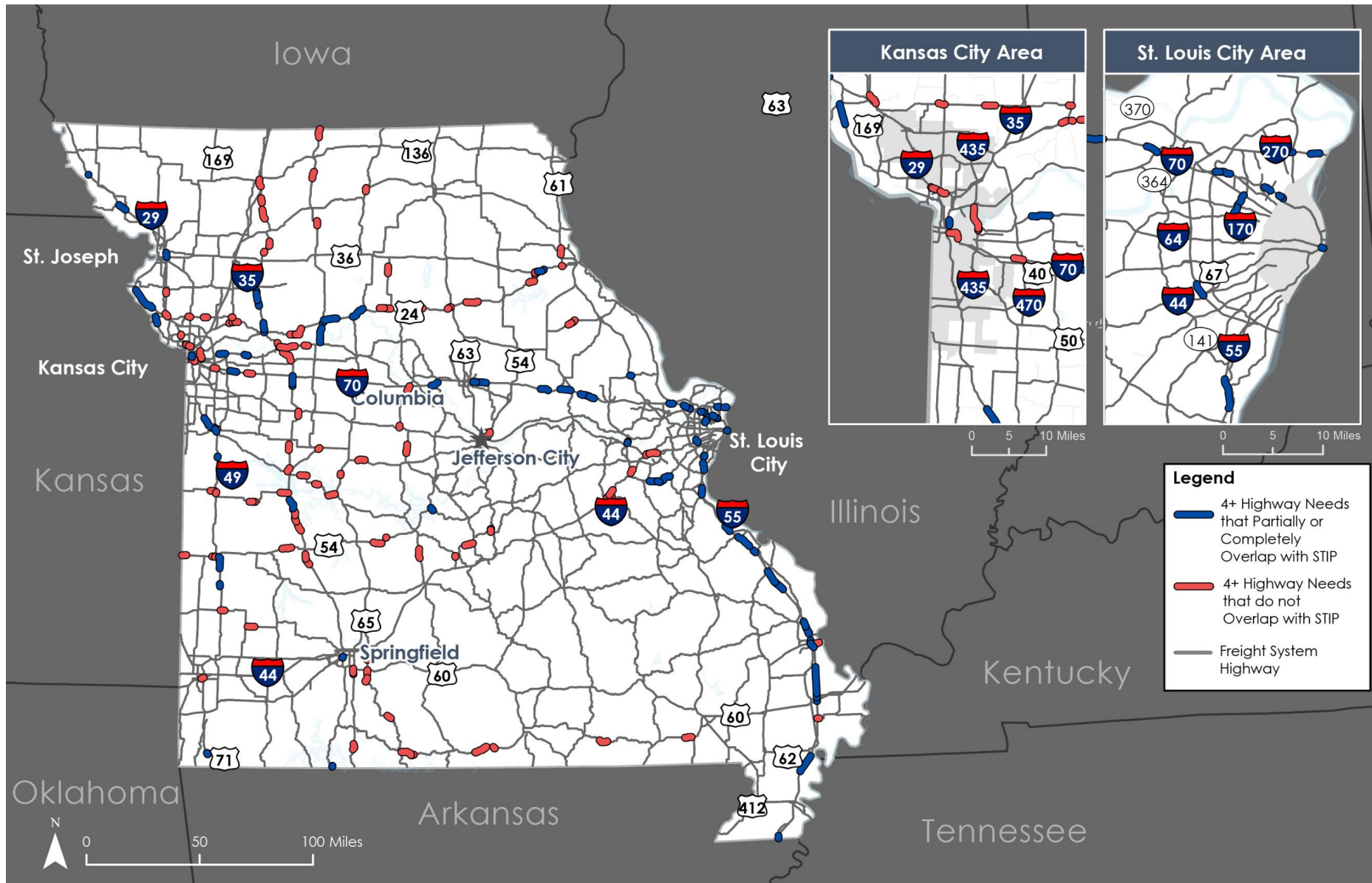
**100** identified projects with a total funding request of **\$92M**, representing just **37%** of the total project cost, with the remaining 63% covered by local and private sources.

#### AIR CARGO

**12** identified needs and projects, half of which are estimated to cost **\$78.5M**, while the cost of remaining needs has not been estimated.



FIGURE 24. FUNDING STATUS OF HIGH-NEED HIGHWAY SEGMENTS



## Missouri's Rail Service and Investment Program

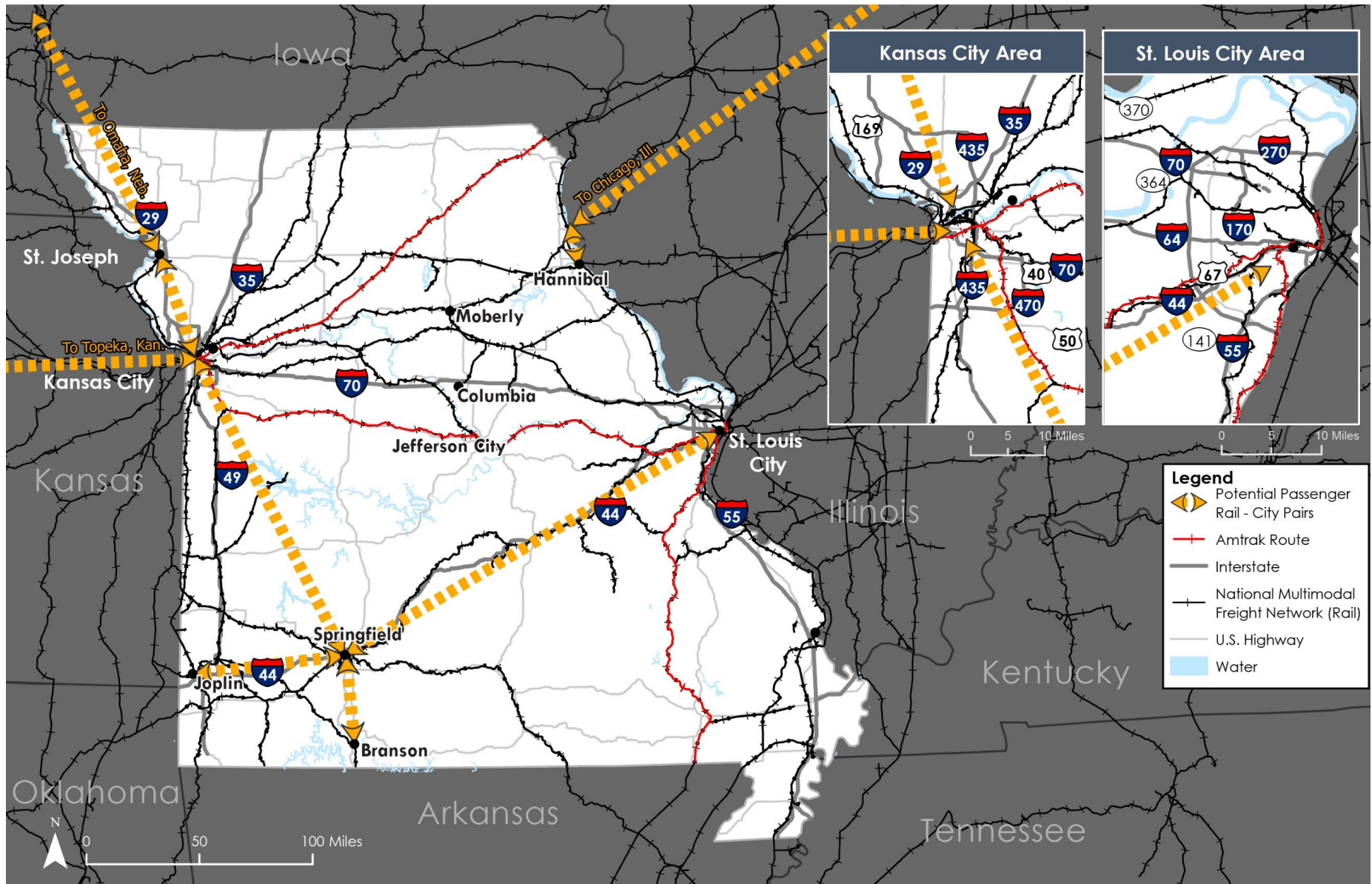
Missouri's Rail Service and Investment Program, developed in accordance with FRA State Rail Plan guidance, describes the state's long-term vision for rail service and the role rail plays in Missouri's larger multimodal transportation network (Figure 25). The RSIP presents the investments necessary to achieving the state's passenger and freight rail vision. This section will discuss how the rail vision below integrates with goals and objectives for the rail system, existing plans and ongoing efforts.

The long-term vision for passenger rail in Missouri is a network of interconnected services, expanded beyond the services of today, connecting major population centers, destinations and small communities alike. Figure 26 visualizes this plan's recommended future services, based on public and stakeholder feedback and prior planning efforts.

**"Missouri's rail vision is to provide safe, environmentally-friendly transportation options supporting efficient movement of freight and passengers, while strengthening communities and advancing global competitiveness through intermodal connectivity."**

The RSIP presents a series of short- and long-term improvements to accommodate the proposed passenger rail network and ensure safe and efficient freight movement to meet future needs. Figure 26 and Table 6 show these proposed rail investments. The **Rail Plan Report** includes further details on Missouri's RSIP. MoDOT will update this list annually through the STIP process as needs emerge and funding changes.

FIGURE 25. LONG-TERM PASSENGER RAIL VISION IN MISSOURI





The map displays the state of Kansas and its neighboring states: Iowa, Missouri, Illinois, Kentucky, Tennessee, Arkansas, and Oklahoma. Major transportation corridors are highlighted, including Interstates (I-29, I-35, I-40, I-44, I-49, I-55, I-70, I-76) and U.S. Highways (US-169, US-24, US-36, US-40, US-48, US-50, US-52, US-54, US-67, US-70, US-76, US-89, US-90, US-92, US-94, US-96, US-98, US-100, US-101, US-103, US-105, US-107, US-109, US-111, US-113, US-115, US-117, US-119, US-121, US-123, US-125, US-127, US-129, US-131, US-133, US-135, US-137, US-139, US-141, US-143, US-145, US-147, US-149, US-151, US-153, US-155, US-157, US-159, US-161, US-163, US-165, US-167, US-169, US-171, US-173, US-175, US-177, US-179, US-181, US-183, US-185, US-187, US-189, US-191, US-193, US-195, US-197, US-199, US-201, US-203, US-205, US-207, US-209, US-211, US-213, US-215, US-217, US-219, US-221, US-223, US-225, US-227, US-229, US-231, US-233, US-235, US-237, US-239, US-241, US-243, US-245, US-247, US-249, US-251, US-253, US-255, US-257, US-259, US-261, US-263, US-265, US-267, US-269, US-271, US-273, US-275, US-277, US-279, US-281, 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US-533, US-535, US-537, US-539, US-541, US-543, US-545, US-547, US-549, US-551, US-553, US-555, US-557, US-559, US-561, US-563, US-565, US-567, US-569, US-571, US-573, US-575, US-577, US-579, US-581, US-583, US-585, US-587, US-589, US-591, US-593, US-595, US-597, US-599, US-601, US-603, US-605, US-607, US-609, US-611, US-613, US-615, US-617, US-619, US-621, US-623, US-625, US-627, US-629, US-631, US-633, US-635, US-637, US-639, US-641, US-643, US-645, US-647, US-649, US-651, US-653, US-655, US-657, US-659, US-661, US-663, US-665, US-667, US-669, US-671, US-673, US-675, US-677, US-679, US-681, US-683, US-685, US-687, US-689, US-691, US-693, US-695, US-697, US-699, US-701, US-703, US-705, US-707, US-709, US-711, US-713, US-715, US-717, US-719, US-721, US-723, US-725, US-727, US-729, US-731, US-733, US-735, US-737, US-739, US-741, US-743, US-745, US-747, US-749, US-751, US-753, US-755, US-757, US-759, US-761, US-763, US-765, US-767, US-769, US-771, US-773, US-775, US-777, US-779, US-781, US-783, US-785, US-787, US-789, US-791, US-793, US-795, US-797, US-799, US-801, US-803, US-805, US-807, US-809, US-811, US-813, US-815, US-817, US-819, US-821, US-823, US-825, US-827, US-829, US-831, US-833, US-835, US-837, US-839, US-841, US-843, US-845, US-847, US-849, US-851, US-853, US-855, US-857, US-859, US-861, US-863, US-865, US-867, US-869, US-871, US-873, US-875, US-877, US-879, US-881, US-883, US-885, US-887, US-889, US-891, US-893, US-895, US-897, US-899, US-901, US-903, US-905, US-907, US-909, US-911, US-913, US-915, US-917, US-919, US-921, US-923, US-925, US-927, US-929, US-931, US-933, US-935, US-937, US-939, US-941, US-943, US-945, US-947, US-949, US-951, US-953, US-955, US-957, US-959, US-961, US-963, US-965, US-967, US-969, US-971, US-973, US-975, US-977, US-979, US-981, US-983, US-985, US-987, US-989, US-991, US-993, US-995, US-997, US-999, US-1001, US-1003, US-1005, US-1007, US-1009, US-1011, US-1013, US-1015, US-1017, US-1019, US-1021, US-1023, US-1025, US-1027, US-1029, US-1031, US-1033, US-1035, US-1037, US-1039, US-1041, US-1043, US-1045, US-1047, US-1049, US-1051, US-1053, US-1055, US-1057, US-1059, US-1061, US-1063, US-1065, US-1067, US-1069, US-1071, US-1073, US-1075, US-1077, US-1079, US-1081, US-1083, US-1085, US-1087, US-1089, US-1091, US-1093, US-1095, US-1097, US-1099, US-1101, US-1103, US-1105, US-1107, US-1109, US-1111, US-1113, US-1115, US-1117, US-1119, US-1121, US-1123, US-1125, US-1127, US-1129, US-1131, US-1133, US-1135, US-1137, US-1139, US-1141, US-1143, US-1145, US-1147, US-1149, US-1151, US-1153, US-1155, US-1157, US-1159, US-1161, US-1163, US-1165, US-1167, US-1169, US-1171, US-1173, US-1175, US-1177, US-1179, US-1181, US-1183, US-1185, US-1187, US-1189, US-1191, US-1193, US-1195, US-1197, US-1199, US-1201, US-1203, US-1205, US-1207, US-1209, US-1211, US-1213, US-1215, US-1217, US-1219, US-1221, US-1223, US-1225, US-1227, US-1229, US-1231, US-1233, US-1235, US-1237, US-1239, US-1241, US-1243, US-1245, US-1247, US-1249, US-1251, US-1253, US-1255, US-1257, US-1259, US-1261, US-1263, US-1265, US-1267, US-1269, US-1271, US-1273, US-1275, US-1277, US-1279, US-1281, US-1283, US-1285, US-1287, US-1289, US-1291, US-1293, US-1295, US-1297, US-1299, US-1301, US-1303, US-1305, US-1307, US-1309, US-1311, US-1313, US-1315, US-1317, US-1319, US-1321, US-1323, US-1325, US-13



TABLE 6. STATEWIDE RAIL VISION IMPROVEMENTS

Project Title	Figure 26 Map Identifier
<b>Short-Term Passenger Rail Improvements</b>	<b>Blue</b>
Kirkwood – Station Upgrades	A
Independence – Station Upgrades	B
<b>Short-Term Freight Rail Improvements</b>	<b>Blue</b>
St. Louis City Municipal River Terminal Rail Upgrades	C
SEMO Port – Loop Track Terminal	D
Cherokee Rail Corridor Safety Project	E
Thayer North Rail Corridor Safety Project	F
Marshall – Corridor Crossing Consolidation Project	G
<b>Long-Term Passenger Rail Improvements</b>	<b>Green</b>
Second Main Line – Lee's Summit to Strasburg	1
Hermann – Universal Crossover	2
Bonnots Mill – Universal Crossover	3
Holden – Siding	4
Knob Noster – Siding	5
Jefferson City – Third Main Line	6
Independence Avenue Bridge	7
Jefferson City – New Station	8
Poplar Bluff – Station Upgrades	9
Pleasant Hill to Jefferson City – Second Main Line	10
Sedalia Station Bicycle/Pedestrian Improvements	11

Project Title	Figure 26 Map Identifier
Warrensburg Station Bicycle/Pedestrian Improvements	12
Carrollton Amtrak Station	13
Track Reconstruction – St. Louis	14
<b>Long-Term Freight Rail Improvements</b>	<b>Green</b>
New Bourbon Port – Rail Improvements	15
COLT Railroad – Capacity Improvements	16
COLT Railroad – Transload Facility Improvements	16
Pike / Lincoln County Port Rail Improvements	17
St. Louis City Port Improvements	18
KCT North-South Corridor Improvements	19
Stoddard County Industrial Park Rail Improvements	20
Lilbourn Industrial Park Rail Improvements	21
Jefferson County Port Development	22
TRRA Tunnel Arch Riverfront Dewatering	23
West Plains – Railroad Overpass	24
West Meadows Yard – Track Realignment	25
COLT Railroad – I-70 Bridge Repair	26
Aurora Organic Dairy – Rail Spur	27
MNA Switch Replacement Program	28
Clinton – Rail Expansion	29
Montrose – Rail Expansion	30

## Call to Action

The Missouri State Freight and Rail Plan is the state's first integrated statewide multimodal freight and passenger rail plan. The 2022 SFRP documents the multimodal freight and passenger rail transportation strengths, weaknesses, opportunities and challenges, both today and well into the future. Today's unprecedented supply chain disruptions gripping the nation and the state provides an opportune time for MoDOT to develop a blueprint for addressing the state's current and future freight transportation needs. In addition, the back-to-back challenges disrupting the *Missouri River Runner* service have threatened the stability and trajectory of the state's passenger rail network, increasing the need for a stronger and more resilient system.

The 2022 SFRP presents **four multimodal, multifaceted and comprehensive strategies** with a total of **49 implementable actions** to help MoDOT address the challenges and needs across the state's freight and rail transportation network, including aging infrastructure, congestion and bottlenecks, safety concerns, system capacity constraints, rural and multimodal connectivity challenges and funding challenges.

**Implementing the recommended policies, programs and projects outlined in the SFRP is critical to the continued economic competitiveness and prosperity of the state of Missouri.**

Implementation of the SFRP will only be successful with the participation and collaboration of all public- and private-sector users and owners of the transportation system, including freight industry stakeholders, passenger rail riders and federal, state, regional and local agencies. MoDOT will continue to leverage the relationships developed from the Missouri Freight Steering Committee and Missouri Rail Passenger Advisory Committee in addition to engaging other stakeholders during the implementation of the SFRP.



## Missouri State Freight and Rail Plan Compliance with the Bipartisan Infrastructure Law

BIL Requirement	Freight and Rail Plan Reference(s)
<b>Plan Contents – A State Freight Plan shall include, at a minimum:</b>	
Identification of significant statewide freight trends, needs and issues	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Economic Futures and Needs Assessment Report, Section 4.0
Description of freight policies, strategies and performance measures that will guide freight-related transportation investment decisions	<b>2022 Missouri State Freight and Rail Plan, Chapter 6</b> Goals, Objectives and Performance Measures Report Strategies and Implementable Actions Report
Critical multimodal rural freight facilities and rural and urban freight corridors	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile Volumes 1 & 2
Link to national multimodal freight policy and highway freight program goals	<b>2022 Missouri State Freight and Rail Plan, Chapter 1</b> Goals, Objectives and Performance Measures Report
Description of how innovative technologies and operational strategies (including ITS) that improve the safety and efficiency of freight movements were considered	<b>2022 Missouri State Freight and Rail Plan, Chapter 6</b> Missouri Freight & Rail Profile Volume 2
Description of improvements to reduce roadway deterioration by heavy vehicles (including mining, agricultural, energy cargo or equipment and timber vehicles)	<b>2022 Missouri State Freight and Rail Plan, Chapters 2 &amp; 6</b> Missouri Freight & Rail Profile Volumes 1 & 2; Economic Futures and Needs Assessment Report, Section 4.0
Inventory of facilities with freight mobility issues and a description of the strategies the state is employing to address the freight mobility issues	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile Volumes 1 & 2; Economic Futures and Needs Assessment Report, Section 4.0
Description of significant congestion or delay caused by freight movements and any mitigation strategies	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile Volumes 1 & 2; Economic Futures and Needs Assessment Report, Section 4.0
Freight investment plan that includes a list of priority projects and describes investment and matching funds	<b>2022 Missouri State Freight and Rail Plan, Chapter 7 and Appendix A</b>
Consultation with the state freight advisory committee	<b>2022 Missouri State Freight and Rail Plan, Chapter 1</b> Stakeholder Outreach Summary Report
Assessment of commercial motor vehicle parking facilities	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile Volume 1; Truck Parking Profile

BIL Requirement	Freight and Rail Plan Reference(s)
<b>Plan Contents – A State Freight Plan shall include, at a minimum:</b>	
Description of supply chain cargo flows	<b>2022 Missouri State Freight and Rail Plan, Chapters 2 &amp; 3</b> Missouri Freight & Rail Profile Volumes 1 & 2
Inventory of commercial ports	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile Volumes 1 & 2
Discussion of the impacts of e-commerce on freight infrastructure	<b>2022 Missouri State Freight and Rail Plan, Chapter 3</b> Missouri Freight & Rail Profile Volumes 1 & 2; Economic Futures and Needs Assessment Report, Section 4.0
Considerations of military freight	<b>2022 Missouri State Freight and Rail Plan, Chapter 3</b> Economic Futures and Needs Assessment Report, Section 4.0
Strategies and goals to decrease a) the severity of impacts of extreme weather and natural disasters on freight mobility, b) the impacts of freight movement on local air pollution, c) the impacts of freight movement on flooding and stormwater runoff, and d) the impacts of freight movement on wildlife habitat loss	<b>2022 Missouri State Freight and Rail Plan, Chapters 1 &amp; 6</b> Goals, Objectives and Performance Measures Report; Strategies and Implementable Actions Report



## Missouri State Freight and Rail Plan Compliance with Passenger Rail Investment and Improvement Act

FRA State Rail Plan Requirements	Freight and Rail Plan Reference(s)
1. Role of Rail in Statewide Transportation	Missouri Freight & Rail Profile – Volume 2: 2.1 Role of Rail in Statewide Transportation
2. State's Existing Rail System	
2.1 Description and Inventory	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile – Volume 2: 2.2 Infrastructure and Existing Rail System
2.2 Trends and Forecasts	<b>2022 Missouri State Freight and Rail Plan, Chapters 4 &amp; 5</b> Missouri Freight & Rail Profile – Volume 2: 2.3 Demographic and Economic Growth Factors, 2.4 Freight Demand Commodity Flow Profile; Economic Impact of Passenger Rail Technical Memorandum
2.3 Rail Service Needs and Opportunities	<b>2022 Missouri State Freight and Rail Plan, Chapter 2</b> Missouri Freight & Rail Profile – Volume 2: 2.5 Performance, 2.6 Key Performance Trends
3. Proposed Passenger Rail Improvements	<b>2022 Missouri State Freight and Rail Plan, Chapters 2 &amp; 7</b> Rail Plan Report: 3.0 Proposed Passenger Rail Improvements and Investments
4. Proposed Freight Rail Improvements	<b>2022 Missouri State Freight and Rail Plan, Chapters 2 &amp; 7</b> Rail Plan Report: 1.2 Proposed Freight Rail Improvements and Investments
5. The State's Rail Service and Investment Program	<b>2022 Missouri State Freight and Rail Plan, Chapters 1 &amp; 7</b> Rail Plan Report: 5.0 Missouri Rail Service and Investment Program
5.1 Vision	Rail Plan Report: 5.1 Vision, Goals and Objectives
5.2 Program Coordination	Rail Plan Report: 5.2 Program Coordination
5.3 Rail Agencies	Rail Plan Report: 5.3 Rail Agencies
5.4 Program Effects	Rail Plan Report: 5.4 Program Effects
5.5 Passenger Element	Rail Plan Report: 5.5 Passenger Element
5.6 Freight Element	Rail Plan Report: 5.6 Freight Element
5.7 Rail Studies and Reports	Rail Plan Report: 5.7 Rail Studies and Reports
5.8 Passenger/Freight Capital Program	Rail Plan Report: 5.8 Passenger and Freight Rail Capital Program
6. Coordination and Review	Rail Plan Report: 6.0 Coordination and Review